



PERSONNEL

QUALIFICATION

STANDARD

FOR

OIL KING/WATER KING

NAME (Rate / Rank)

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INTRODUCTION

PQS PROGRAM

PQS is a system for qualifying officers and enlisted personnel to perform certain duties. It is a compilation of the knowledge and skills required to qualify for specific watchstations/ workstations, maintain specific equipment or perform as a team member within your unit. The PQS Program is not designed as a training program, but provides many training objectives. This PQS has been written by fleet personnel who are currently performing in the watchstations/ workstations covered in this package and with many years of experience. They have determined that these are the minimum requirements for safely and effectively performing at these watchstations/ workstations.

CANCELLATION

This Standard cancels and supersedes NAVEDTRA 43116-5E.

APPLICABILITY

This PQS is applicable to all ships except CV/CVN.

TAILORING

To command tailor this package, first have it reviewed by one or more of your most qualified individuals. Delete any portions covering systems and equipment not installed on your ship, aircraft or unit. Next, add any line items, fundamentals, systems and watchstations/ workstations that are unique to your command but not already covered in this package. Finally, the package should be reviewed by the cognizant department head and required changes approved by the Commanding Officer or his designated representative. Retain the approved master copy on file for use in tailoring individual packages.

QUALIFIER

The PQS Qualifier is designated in writing by the Commanding Officer to sign off individual PQS line items. Qualifiers will normally be E-5 or above and, as a minimum, must have completed the PQS they are authorized to sign off. The names of designated Qualifiers should be made known to all members of the unit or department. The means of maintaining this listing is at the discretion of individual commands. For more information on the duties and responsibilities of PQS Qualifiers, see the PQS Management Guide.

INTRODUCTION (CONT'D)

CONTENTS

This PQS is divided into three sections. The 100 Section (Fundamentals) contains the fundamental knowledge or book learning necessary for satisfactory understanding of the watchstation/workstation duties. The 200 Section (Systems) is designed to acquaint you with the systems you will be required to operate at your watchstation/workstation. The 300 Section (Watchstations) lists the tasks you will be required to satisfactorily perform in order to achieve final PQS qualification for a particular watchstation/workstation. Detailed explanations are provided at the front of each section.

REFERENCES

The references used during the writing of this PQS package were the latest available to the workshop at the time. However, the most current references available should be used when qualifying with this Standard.

TRAINEE

Your supervisor will tell you which watchstations/workstations you are to complete and in what order. Before getting started, turn to the 300 Section first and find your watchstation/ workstation. This will tell you what you should do before starting your watchstation/ workstation tasks. You may be required to complete another PQS, a school, or other watchstations/workstations within this package. It will also tell you which fundamentals and systems from this package you must complete prior to qualification at your watchstation/ workstation. If you have any questions or are unable to locate references, contact your supervisor or qualifier. Good Luck!

PQS FEEDBACK REPORTS

This PQS was developed using information currently available at the time of writing. When equipment and requirements change, the PQS needs to be revised. The only way the PQS Development Group knows of these changes is by you, the user, telling us either in a letter or via the Feedback Report contained in the back of this book. You can tell us of new systems and requirements, or of errors you find.

DEFINITIONS OF WORDS USED IN PQS

AIRCREW EVOLUTION : A grouping of aircrew tasks that measure performance in the course of a flight

COMPONENTS : Major units that make up a system when properly connected

COMPONENT PART : A major part of a component

CONTROL/COORDINATION : Refers to the safe performance of multiple tasks to be accomplished by two or more work centers/persons at the same time

CONTROL SIGNAL : A signal used to control electronic or mechanical devices

EMERGENCY : An event or series of events in progress that will cause damage to equipment or injury to personnel unless immediate corrective steps are taken

FUNDAMENTALS : Basic facts, theories, laws or principles (100 Section in PQS)

INFREQUENT TASKS : Tasks performed under casualty conditions or tasks that are not done as a regular part of watchstation routine; may be simulated

INTERLOCK : A protective device to prevent the unsafe operation of equipment or to sequence the action of systems, components or component parts

MAINTENANCE ACTION : A maintenance technician qualification that measures ability to perform a designated task

NORMAL OPERATING VALUE : The point at which satisfactory performance may be expected

OPERATING LIMITS : Maximum and minimum allowable values

PARAMETER : A variable (temperature, pressure, flow rate, voltage, current, frequency, etc.) that must be indicated, monitored, checked or sensed during operation or testing

PROTECTIVE FEATURE : A device designed to prevent damage or injury

SENSING POINT : The point in a system at which a signal may be detected

SET POINT : The value of a parameter at which: (a) an alarm is set off, (b) operator action is required, (c) valves open or shut, (d) proper operation stops and damage may occur, or (e) the optimum value for normal operation

DEFINITIONS OF WORDS USED IN PQS (CONT'D)

SOURCES OF POWER : Circuits or devices that supply power, energy or charge to a component/component part; includes electrical, mechanical, hydraulic and pneumatic

SUPPORT ACTION : A qualification that measures the ability to perform specific or repetitive tasks that do not involve the correction of a malfunction or repair of equipment

SYSTEMS : Groups of components that operate together to perform specific functions (200 Section in PQS)

SYSTEM INTERFACE : (a) How outside influences affect the operation of this system, or (b) How the operation of this system affects the operation of other systems or equipment

UNDER INSTRUCTION WATCHES : The trainee will perform the duties and tasks of the watchstation under the *direct* supervision of a qualified watchstander or supervisor. This is intended to provide a one-on-one training situation

UNDER QUALIFIED SUPERVISION WATCHES : The trainee will perform the duties and tasks of the watchstation with minor guidance from a qualified watchstander or supervisor; this is intended to provide the trainee with proficiency while standing the watch in an operational environment

WATCHSTATION : An operator qualification that includes duties, assignments or responsibilities that an individual may be called upon to perform (not necessarily limited to a specific time period) (300 Section in PQS).

100 INTRODUCTION TO FUNDAMENTALS

100.1 INTRODUCTION

This PQS begins with a Fundamentals section covering the basic knowledge and principles needed to understand the equipment or duties to be studied. Normally, you would have acquired the knowledge required in the Fundamentals section during the school phase of your training. If you have not been to school or if you need a refresher, the references listed at the beginning of each fundamental will aid you in a self-study program. All references cited for study are selected according to their credibility and availability.

100.2 SAFETY

Because safety is of paramount consideration, the first subsection of Fundamentals describes the safety precautions which apply throughout the PQS. This permits a subsequent listing in the Systems sections of those safety precautions *unique* to a given system.

100.3 HOW TO COMPLETE

The fundamentals you will have to complete are listed in the watchstation (300 section) for each watchstation. You should complete all required fundamentals before starting the systems and watchstation portions of this PQS, since the knowledge gained from fundamentals will aid you in understanding the systems and your watchstation tasks. When you feel you have a complete understanding of one fundamental or more, contact your Qualifier. If you are attempting initial qualification, your Qualifier will expect you to satisfactorily answer all line items in the fundamentals before signing off completion of that fundamental. If you are requalifying or have completed the appropriate schools, your Qualifier may require you to answer representative line items to determine if you have retained the necessary knowledge for your watchstation. If your command requires an oral board or written examination for final qualification, you may be asked any questions from the fundamentals required for your watchstation.

References:

- [a] NAVEDTRA 12001, Fireman
 - [b] NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual, ch. 505
 - [c] NAVEDTRA 10546-F, Electrician's Mate 3 & 2, ch. 2
 - [d] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
 - [e] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [f] NAVEDTRA 12144, Machinist's Mate 3 & 2
 - [g] NAVSEA S9086-SY-STM-010, Naval Ships' Technical Manual, ch. 551, sec. 1
 - [h] NAVSEA S9086-S3-STM-010, Naval Ships' Technical Manual, ch. 555
 - [i] NAVSEA S9086-VG-STM-010, Naval Ships' Technical Manual, ch. 634, sec. 3
 - [j] NAVSEA S9086-T8-STM-010, Naval Ships' Technical Manual, ch. 593, sec. 3
 - [k] NAVSEA S9086-H7-STM-010, Naval Ships' Technical Manual, ch. 262, sec. 6
 - [l] NAVSEA S9086-K9-STM-000, Naval Ships' Technical Manual, ch. 330, sec. 2
 - [m] NAVSEA S9086-SX-STM-010, Naval Ships' Technical Manual, ch. 550, sec. 1
 - [n] NAVSEA S9086-CH-STM-030, Naval Ships' Technical Manual, ch. 074(V3), sec. 18
 - [o] NAVSEA S9086-WK-STM-010, Naval Ships' Technical Manual, ch. 670
 - [p] NAVSEA S9086-SN-STM-010, Naval Ships' Technical Manual, ch. 541, sec. 2
 - [q] NAVSEA S9086-54-STM-010, Naval Ships' Technical Manual, ch. 556
 - [r] NAVSEA S9086-CL-STM-010, Naval Ships' Technical Manual, ch. 077, sec. 2
 - [s] OPNAVINST 5090.1A, Environmental and Natural Resources Program Manual
 - [t] NAVSEA S9086-RW-STM-010, Naval Ships' Technical Manual, ch. 516, sec. 1
 - [u] OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy (SORM)
 - [v] NAVSEA S9086-KC-STM-010, Naval Ships' Technical Manual, ch. 300
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- 101.1 Explain the use of each of the following:
- a. Lagging [ref. a, app. I]
 - b. Flange spray shields [ref. b, sec. 7]
 - c. Incandescent light steam-tight cover (explosion proof) [ref. l]
- .2 State the safety precautions to be followed when working with rotating machinery. [ref. d, ch. C13]
- .3 What are the safety precautions to be followed when operating a compressed air system? [ref. g]
- .4 State good housekeeping practices of engineering spaces. [ref. d, ch. C1; ref. f, ch. 7]
- .5 State the importance of bolted deck plates, gratings and handrails. [ref. d, chs. C1, C13]
- .6 State the dangers of skylarking in machinery spaces. [ref. d, ch. C1]

101 **ENGINEERING SAFETY PRECAUTIONS FUNDAMENTALS (CONT'D)**

- 101.7 Explain the hazard of oil in the bilges. [ref. h, sec. 6; ref. o, sec. 2]
- .8 State the safety precautions applicable for the use, handling and storage of hydraulic fluids and synthetic lubricants aboard your ship. [ref. k; ref. q, sec. 1]
- .9 Explain the oily waste discharge limitations as they apply to shipboard personnel. [ref. j; ref. s, ch. 17]
- .10 State the procedures required in the event of an oil spill. [ref. s, ch. 11]
- .11 State the causes of oil fires. [ref. d, ch. C10; ref. h, sec. 6; ref. p]
- .12 State the protection provided by the following safety equipment; include examples of ship evolutions that require their use:
- a. Long-sleeved shirt [ref. d, ch. C13]
 - b. Hard hat [ref. d, ch. B12]
 - c. Goggles/safety glasses/face shield [ref. d, ch. B5; app. B5-B]
 - d. Gloves [ref. d, ch. B12]
 - e. Safety shoes [ref. d, ch. B12]
 - f. Respirator [ref. d, ch. B6; app. B6-E]
 - g. Hearing protection [ref. d, ch. B4]
 - h. Safety harness/DYNA-Brake [ref. d, ch. B12]
 - i. Life jacket [ref. r, table 077-1]
- .13 What are the safety precautions to be followed prior to and when entering a void or poorly ventilated space? [ref. n]
- .14 What are the safety precautions to be followed when using the following:
- a. Calcium hypochlorite [ref. d, ch. C23]
 - b. Solvents [ref. d, ch. C23]
 - c. Caustic soda [ref. e, sec. 24; ref. o, sec. 1]
 - d. Mercuric nitrate [ref. e, sec. 24; ref. o, sec. 1]
 - e. Refrigerants [ref. f, ch. 11; ref. o, sec. 3; ref. t]
 - f. Stock reagents [ref. e, sec. 24; ref. o, sec. 1]
- .15 State the safety precautions to be observed and/or personnel safety equipment/devices required in the following situations:
- a. During replenishment-at-sea operations [ref. d, ch. C3]
 - b. When working aloft [ref. d, ch. C8]
 - c. During heavy weather [ref. d, ch. C16]
 - d. While working with paint [ref. d, ch. C18]

101 **ENGINEERING SAFETY PRECAUTIONS FUNDAMENTALS (CONT'D)**

- 101.15 e. While working with electrical/electronic equipment [ref. d, ch. C9; ref. u, sec. 510]
- f. While operating portable electric tools [ref. d, chs. C9, C13]
- g. While welding, cutting and brazing [ref. d, ch. C11]
- h. While working with workshop equipment [ref. d, ch. C13]
- i. While handling hazardous material [ref. d, ch. C23]
- j. While working with synthetic lube oil (MIL-L-23699) [ref. o, sec. 4]
- k. While working with pneumatic tools [ref. d, ch. C13]

- .16 State the first aid procedures for electrical shock. [ref. d, ch. C9; ref. v, sec. 2]

- .17 State the purpose of the following as safety equipment when performing hazardous tasks:
 - a. Rubber mats [ref. i]
 - b. Rubber aprons [ref. d, ch. C23]

- .18 State the importance of tag-out procedures and clearing of tags. [ref. c; ref. d, ch. C9, ref. u, sec. 6]

- .19 State the safety precautions to follow when working on or close to electrical circuits. [ref. d, ch. C9]

- .20 State the procedures for removing a victim from an energized circuit. [ref. d, ch. C9; ref. v, sec. 2]

- .21 Describe how changes in the body caused by the environment (sweat, moisture, etc.) change the way electrical shock affects the body. [ref. c; ref. v, sec. 2]

- .22 State the safety precautions associated with each firefighting agent. [ref. h, sec. 1]

- .23 Explain the possible damage caused by missile hazards and flammable materials as applied to safety. [ref. d, ch. C1]

- .24 State the first aid procedures for treatment of acid on skin and/or in eyes. [ref. o, sec. 6]

- .25 Explain the procedures to follow when working on a pressure system component. [ref. b, sec. 8]

- .26 State the procedures for working on a system that opens to the sea. [ref. b, sec. 1]

101 ENGINEERING SAFETY PRECAUTIONS FUNDAMENTALS (CONT'D)

- 101.27 Draw a simple diagram of machinery locations, indicating access and escape routes in the main space. [refer to ship's diagram]

- .28 State the hazardous material labeling requirements. [ref. d, ch. B3]

- .29 Explain the effect of petroleum products in relation to oxygen producing and storage devices. [ref. m]

References:

- [a] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [b] NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual, ch. 505
 - [c] NAVSEA S9086-HZ-STM-010, Naval Ships' Technical Manual, ch. 255, vols. 1, 2
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102.1 Describe the characteristics and uses of the following boilers:

- a. Type A [ref. a, sec. 21]
- b. Type B [ref. a, sec. 21]
- c. Auxiliary [ref. a, sec. 29]
- d. Waste heat [ref. a, sec. 30]
- e. Chelant [ref. a, sec. 31]

.2 Define the following types of water:

- a. Boiler water [ref. a, sec. 21]
- b. Condensate [ref. a, sec. 21]
- c. Deaerated feedwater [ref. a, sec. 21]
- d. Distillate [ref. a, sec. 21]
- e. Feedwater [ref. a, sec. 21]
- f. Freshwater [ref. a, sec. 21]
- g. Low pressure/freshwater drains [ref. a, sec. 21]
- h. Makeup feedwater [ref. a, sec. 21]
- i. Potable water [ref. a, glossary]
- j. Reserve feedwater [ref. a, sec. 21]
- k. Shore water [ref. a, glossary]

.3 Define the following indicators:

- a. Conductivity meter/cell [ref. a, sec. 24]
- b. Conductivity indicator [ref. a, sec. 23]
- c. Salinity cell [ref. a, sec. 24]
- d. Salinity indicator [ref. a, sec. 23]

.4 Define the following equipment:

- a. Condenser [ref. c, sec. 2]
- b. Deaerating feed tank [ref. c, sec. 5]
- c. Fresh water drain tank [ref. c, sec. 2]
- d. Sounding tubes [ref. a, sec. 24]
- e. Test cabinet [ref. a, sec. 28]
- f. Thief sampler [ref. a, sec. 24]

.5 Draw the shipboard water cycle for your ship. [ref. a, sec. 21]

102 WATER CHEMISTRY FUNDAMENTALS (CONT'D)

102.6 Define the following units of measurement: [ref. a, glossary]

- a. Equivalent parts per million (epm)
- b. Micromhos/centimeter (umho/cm)
- c. Milliliter (mL)
- d. Parts per billion (ppb)
- e. Parts per million (ppm)

.7 Define alkalinity and acidic. [ref. a, glossary]

.8 List color coding requirements for various types of water systems. [ref. b, sec. 7]

References:

- [a] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [b] NAVSEA S9086-GY-STM-01B, Naval Ships' Technical Manual, ch. 221
 - [c] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
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103.1 Define the following terms:

- a. Acid corrosion [ref. a, glossary]
- b. Alkalinity [ref. a, glossary]
- c. Carryover [ref. a, sec. 23]
- d. Caustic corrosion [ref. a, glossary]
- e. Chelant chemical hideout [ref. a, sec. 31]
- f. Chemical hideout [ref. a, sec. 21]
- g. Chloride [ref. a, glossary]
- h. Conductivity [ref. a, glossary]
- i. Contamination [ref. a, glossary]
- j. Coordinated phosphate pH control [ref. a, sec. 21]
- k. Dilution [ref. a, sec. 22]
- l. Disodium phosphate (DSP) [ref. a, glossary]
- m. Free caustic [ref. a, sec. 21]
- n. Hazardous material [ref. c, ch. B3]
- o. Hazardous waste [ref. c, ch. B3]
- p. Hydrazine [ref. a, glossary]
- q. Indicator [ref. a, sec. 24]
- r. Moderate chelant contamination [ref. a, sec. 23]
- s. pH [ref. a, sec. 21]
- t. Phosphate [ref. a, glossary]
- u. Reagent [ref. a, sec. 24]
- v. Scale [ref. a, glossary]
- w. Serious auxiliary boiler contamination [ref. a, sec. 29]
- x. Serious chelant contamination [ref. a, sec. 31]
- y. Serious cophos contamination [ref. a, sec. 23]
- z. Serious waste heat boiler contamination [ref. a, sec. 30]
- aa. Significant auxiliary boiler damage [ref. a, sec. 29]
- ab. Significant chelant damage [ref. a, sec. 31]
- ac. Significant cophos damage [ref. a, sec. 23]
- ad. Significant waste heat boiler damage [ref. a, sec. 30]
- ae. Silica [ref. a, sec. 21]
- af. Sludge [ref. a, glossary]
- ag. Sodium hydroxide (caustic soda) [ref. a, sec. 22]
- ah. Standards [ref. a, sec. 24]
- ai. Stock solution [ref. a, sec. 24]
- aj. Suspended solids [ref. a, glossary]
- ak. Titration [ref. a, sec. 24]
- al. Trisodium EDTA [ref. a, sec. 31]

103 BOILER WATER CHEMISTRY FUNDAMENTALS (CONT'D)

- 103.1
 - am. Trisodium phosphate (TSP) [ref. a, sec. 22]
 - an. Moderate auxiliary boiler contamination [ref. a, sec. 29]
 - ao. Moderate chelant contamination [ref. a, sec. 23]
 - ap. Moderate waste heat boiler contamination [ref. a, sec. 30]
- .2 Define the following equipment:
 - a. Hydrazine test kit [ref. a, sec. 31]
 - b. pH meter [ref. a, sec. 24]
 - c. Silica test kit [ref. a, sec. 22]
- .3 Explain the purposes and shipboard application of the following:
 - a. Bottom blowdowns [ref. a, sec. 22]
 - b. Chemical cleaning [ref. b, sec. 2]
 - c. Chemical injection [ref. a, sec. 22]
 - d. Dry run (waste heat boiler) [ref. a, sec. 30]
 - e. Mechanical cleaning [ref. b, sec. 2]
 - f. Surface/scum blowdown [ref. a, sec. 22]
- .4 Define your boiler water chemistry limits.
 - a. Auxiliary boilers [ref. a, sec. 29]
 - b. Chelant boilers [ref. a, sec. 31]
 - c. Main propulsion boiler [ref. a, sec. 22]
 - d. Waste heat [ref. a, sec. 30]
- .5 What are the different boiler lay-up methods and the length of time a boiler may be laid up under each method? [ref. b, sec. 2]
- .6 When is a boiler lay-up checked? [ref. b, sec. 2]

Reference:

[a] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2

104.1 Define the following terms:

- a. Bicarbonate [sec. 21]
- b. Chelant [sec. 31]
- c. Chloride [sec. 21]
- d. Condensation [sec. 21]
- e. Conductivity [glossary]
- f. Deaerating [glossary]
- g. Dissolved oxygen [sec. 21]
- h. Feedwater neutrality [sec. 21]
- i. Hardness [sec. 21]
- j. Morpholine [sec. 21]

.2 Define the following equipment:

- a. Continuous injection system [sec. 31]
- b. Dissolved oxygen test kit [sec. 26]
- c. Ion exchange demineralizer [glossary]

.3 Describe the purpose for maintaining the quality of feedwater [sec. 21]

.4 Discuss the requirements for conducting the salinity/conductivity cell comparison test. [sec. 22]

.5 What tests are required for shore steam to be acceptable when used as a steam blanket? [sec. 22]

References:

- [a] NAVMED P-5010-6, Manual Preventive Medicine, ch. 6
 - [b] NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual, ch. 505
 - [c] NAVSEA S9086-SE-STM-010, Naval Ships' Technical Manual, ch. 533
 - [d] NAVSEA S9086-WK-STM-010, Naval Ships' Technical Manual, ch. 670
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105.1 Define the following:

- a. Bacteriological testing [ref. a]
- b. Brominator method [ref. c, sec. 3]
- c. Chlorinator method [ref. c, sec. 3]
- d. Halogen residual [ref. c, sec. 3]
- e. Tanks [ref. c, sec. 2]

.2 What is the appropriate color code which pertains to this system?
[ref. b, sec. 7]

.3 Describe the proper storage, handling and use of the following:

- a. Bromine Cartridge [ref. c, sec. 3]
- b. Calcium Hypochlorite [ref. d, sec. 5]

.4 Discuss the following:

- a. Testing required by engineering department [ref. c, sec. 4]
- b. Sanitation bill [ref. a]

.5 What are the limits and frequencies for the following tests:

- a. Bromine [ref. a]
- b. Chloride [ref. a]
- c. Bacteriological [ref. a]
- d. pH [ref. c, sec. 4]

Reference:

[a] NAVSEA S9086-HB-STM-005, Naval Ships' Technical Manual, ch. 233, sec. 10

- 106.1 Define the following terms:
- a. Inhibited antifreeze (MIL-A-46153)
 - b. MIL-A-53009 inhibitor
 - c. Nalcool-2000
 - d. Soluble oil
- .2 Describe and explain the use of the Jacket Water Treatment Log.
- .3 Discuss the basic operations for the prevention of scale and the corrosion of the diesel engine jacket.
- .4 What is the frequency for testing jacket water?
- .5 What are the chemical limits of the following:
- a. Inhibited antifreeze
 - b. MIL-A-53009 inhibitor
 - c. Nalcool-2000
 - d. Soluble oil
- .6 Describe the procedures for removing the following deposits from jacket water:
- a. Oil/preservatives
 - b. Rust/scale
- .7 Describe hydrostatic test requirements for jacket water systems.

References:

- [a] NAVSEA S9086-SN-STM-000, Naval Ships' Technical Manual, ch. 541
 - [b] NAVSEA S9086-SP-STM-000, Naval Ships' Technical Manual, ch. 542
 - [c] NAVEDTRA 10536-F, Boiler Technician 1 & C, ch. 7
 - [d] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
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- 107.1 State the purpose of the Fuel Oil Management Program. [ref. c]
- .2 Explain how the following samples are obtained: [ref. a, sec. 10]
 - a. All levels sample
 - b. Bottom sample
 - c. Line sample
 - d. Sounding sample
 - e. Thief sample
- .3 Define or explain the following:
 - a. American Petroleum Institute (API) gravity [ref. a, sec. 10]
 - b. Bottom sediment and water (BS&W) [ref. a, sec. 10]
 - c. Calorific or heating value [ref. a, sec. 10]
 - d. Cetane number [ref. a, sec. 10]
 - e. Clear and bright [ref. b, sec. 1]
 - f. Cloud point [ref. a, sec. 10]
 - g. Flash point [ref. a, sec. 10]
 - h. Free water [ref. a, sec. 10]
 - i. JP-5 (F-44 fuel) [ref. b, sec. 1]
 - j. NATO F-75 fuel [ref. a, sec. 10]
 - k. NATO F-76 fuel [ref. a, sec. 10]
 - l. Specific gravity [ref. a, sec. 10]
 - m. Viscosity (kinematic) [ref. a, sec. 10]
 - n. Visual test [ref. a, sec. 10]
- .4 State the procedures used, communications established, and reports required prior to transfer or receipt of fuel. [ref. c]
- .5 What are the minimum requirements for sampling fuel during replenishment? [ref. a, sec. 10]
- .6 Explain the use of the following logs and reports:
 - a. Fuel Oil and Water Report [ref. d, sec. 27]
 - b. Fuel Oil Management Log [ref. c]
- .7 State the minimum requirements for testing fuel oil on board naval ships. [ref. a, sec. 10]
- .8 What is the minimum flash point for fuel oil? [ref. a, sec. 10]

References:

- [a] NVPERS 12960, Principles of Naval Engineering, ch. 6
 - [b] NAVEDTRA 12144, Machinist's Mate 3 & 2
 - [c] NAVEDTRA 10539, Engineman 3, ch. 8
 - [d] NAVEDTRA 12964, Fluid Power
 - [e] NAVSEA S9086-H7-STM-010, Naval Ships' Technical Manual, ch. 262, sec. 5
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108.1 Define the following terms:

- a. Autogenous ignition point [ref. b, ch. 4]
- b. BS&W [ref. e]
- c. Carbon residue [ref. c]
- d. Clear and bright [ref. e]
- e. Demulsification [ref. b, ch. 4]
- f. Emulsion [ref. b, app. AI-7]
- g. Flash point [ref. b, ch. 4]
- h. Neutralization number [ref. c]
- i. Pour point [ref. c]
- j. Precipitation number [ref. c]
- k. Transparency test [ref. e]
- l. Viscosity (SSU) [ref. c]
- m. Visual test [ref. e]

.2 Define the following types of friction: [ref. a]

- a. Fluid
- b. Kinetic
- c. Rolling
- d. Sliding
- e. Static

.3 Explain how each of the following affects lube oil quality:

- a. Temperature [ref. b, ch. 4]
- b. Water [ref. b, ch. 4]
- c. Carbon residue [ref. c]

.4 State the purpose and required frequency of conducting tests of lubricating oil aboard your ship. [ref. e]

.5 Discuss the following processes of oil purification: [ref. b, ch. 4]

- a. Batch
- b. Continuous

.6 How is the classification of lubricating oil determined? [ref. b., ch. 4]

108 LUBRICATING AND HYDRAULIC OIL FUNDAMENTALS (CONT'D)

- 108.7 State the two most commonly used oil purifiers in naval applications. [ref. b, ch. 4]
- .8 How are hydraulic fluids classified, and what are the three general classifications of hydraulic fluids currently used in shipboard applications? [ref. d, ch. 3]

References:

- [a] OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy
 - [b] Engineering Department Organization Manual (EDORM)
 - [c] NAVEDTRA 12043, Basic Military Requirements
 - [d] NAVSEA 0901-LP-420-0002, Naval Ships' Technical Manual, ch. 9420
 - [e] NAVSEA S9086-GY-STM-000, Naval Ships' Technical Manual, ch. 221, sec. 3
 - [f] NAVSEA S9086-SE-STM-010, Naval Ships' Technical Manual, ch. 533
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- 109.1 What is the purpose of the Physical Security Program? [ref. a, ch. 6]
- .2 How often are engineering spaces aboard your ship inspected? [ref. b]
- .3 What engineering spaces aboard your ship are locked during cold iron conditions? [See local instructions]
- .4 To whom do you report violations of physical security? [ref. a, ch. 6]
- .5 What are the requirements aboard your ship for locking devices and seals on the following:
- a. Aqueous Film Foaming Foam (AFFF) System valves [See local instructions]
 - b. Ballast and deballast valves [See local instructions]
 - c. Boiler safety valves [ref. e]
 - d. Desuperheater outlet valves [See local instructions]
 - e. Feedwater sounding tubes [See local instructions]
 - f. Fuel oil transfer valves [See local instructions]
 - g. Lube oil rundown valves [See local instructions]
 - h. Lube oil sampling valves [See local instructions]
 - i. Lube oil sight flow indicators (Bull's-eyes) [See local instructions]
 - j. Lube oil transfer valves [See local instructions]
 - k. Main lube oil pump suction and discharge valves [See local instructions]
 - l. Potable water sounding tubes [ref. f, sec. 2]
 - m. Propulsion reduction gears [ref. d, sec. IV]
 - n. Spring bearing/line shaft bearing inspection covers [See local instructions]
- .6 Explain the procedures for reporting the following:
- a. Bomb threat [See local instructions]
 - b. Fire/Flooding [ref. c, ch. 15]
 - c. Intruder [See local instructions]
 - d. Sabotage [ref. a, ch. 5]
 - e. Main reduction gear covers [See local instructions]

110 HEARING CONSERVATION PROGRAM FUNDAMENTALS

Reference:

[a] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, ch. B4

- 110.1 State the goal of the Hearing Conservation Program.
- .2 Who is covered under the Hearing Conservation Program?
- .3 When is the wearing of hearing protective devices (insert plugs or circumaural muffs) mandatory?
- .4 When are hearing tests required?
- .5 When is double hearing protection required?
- .6 Where are hazardous noise warning labels and decals placed?
- .7 How often are identified noise hazardous areas and operations resurveyed, and by whom?
- .8 What is the purpose of monitoring the hearing tests?
- .9 What action is taken if a significant threshold shift is identified?
- .10 Identify the noise hazardous areas aboard your ship.
- .11 What are the command training requirements for Hearing Conservation Program education?

111 SHIPBOARD HEAT STRESS CONTROL AND PERSONNEL PROTECTION FUNDAMENTALS

References:

- [a] OPNAVINST 5100.19C, Shipboard Heat Stress Control and Personnel Protection, ch. B2
- [b] NAVEDTRA 12081, Standard First Aid Training Course, ch. 7
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- 111.1 State the purpose of the Heat Stress Program. [ref. a]
- .2 Define heat stress. [ref. a]
- .3 What are the symptoms of heat stress? [ref. a]
- .4 What are the symptoms of heat exhaustion? [ref. b]
- .5 What are the first aid steps for treatment of heat exhaustion? [ref. b]
- .6 What are the symptoms of heat stroke? [ref. b]
- .7 What are the first aid steps for treatment of heat stroke? [ref. b]
- .8 What precautions must be taken for fighting heat stress? [ref. a]
- .9 Who is responsible for taking the required heat stress surveys? [ref. a]
- .10 What is the frequency of conducting heat stress surveys? [ref. a]
- .11 Define the following terms: [ref. a]
- a. Personnel recovery period
 - b. PHEL chart
 - c. WBGT
- .12 What is a WBGT meter (heat stress monitor) used for? [ref. a]
- .13 What are the requirements for the positioning of dry bulb thermometers? [ref. a]
- .14 Who can authorize extension of safe stay times? [ref. a]

References:

- [a] NAVEDTRA 12147, Engineering Administration
 - [b] OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy (SORM), ch. 6
 - [c] NAVEDTRA 10543-E1, Engineman 1 & C
 - [d] NAVSEA S9086-CH-STM-030, Naval Ships' Technical Manual, ch. 074(V3)
 - [e] Engineering Department Organization Manual (EDORM)
 - [f] NAVEDTRA 12144, Machinist's Mate 3 & 2
 - [g] OPNAVINST 4100.11B, Navy Energy Usage Reporting System (NEURS)
 - [h] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
 - [i] Class Advisory Notebook
 - [j] Local Instruction
 - [k] OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual, ch. 1
 - [l] NAVEDTRA 10193-D, Instrumentman 3 & 2, ch. 2
 - [m] NWP 62-1 (Revision D), Surface Ship Survivability
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- 112.1 State the location of the following manuals aboard your ship:
[ref. j]
- a. OPNAVINST 3120.32B, Standard Organization and Regulations Manual of the U.S. Navy (SORM)
 - b. Engineering Department Organization Manual (EDORM)
 - c. Ship's Information Book (SIB)
 - d. Engineering Operational Sequencing System (EOSS)
 - e. Propulsion Plant Manual (PPM)
 - f. Guide for User's Maintenance of NAVSEA Technical Manuals
 - g. Class Advisory Notebook
 - h. Main Space Fire Doctrine
- .2 Describe your duties as defined in OPNAVINST 3120.32B and EDORM.
[refs. b, e]
- .3 What are the duties of the following as defined in your ship's EDORM: [ref. e, ch. 1]
- a. Engineering Officer
 - b. Main Propulsion Assistant
 - c. Damage Control Assistant
 - d. Electrical Officer
 - e. Engineering Administrative Assistant
 - f. Oil King
 - g. Engineering Duty Officer (EDO)
 - h. Engineering Officer of the Watch (EOOW)

112 **ENGINEERING ADMINISTRATION FUNDAMENTALS (CONT'D)**

- 112.4 State the in-port watchstations as defined in your ship's EDORM, and describe the duties and responsibilities of each watchstander. [ref. e, ch. 1]
- .5 Explain the procedures required to permit underwater work by divers. [ref. b]
- .6 Explain the procedures required aboard your ship to gain permission to go aloft. [ref. h, ch. C8]
- .7 Describe the steps required to obtain permission to turn over the main shafting. [ref. f, ch. 7]
- .8 Who gives permission to start/test major machinery in port? [ref. f, ch. 7]
- .9 State the legal records of the Engineering Department. [ref. a, ch. 2]
- .10 State the purpose of the Main Space Fire Doctrine. [ref. e, ch. 6]
- .11 What are the following logs/reports:
 - a. Engineering Log [ref. a, ch. 2]
 - b. Bell Book [ref. a, ch. 2]
 - c. Bell Log/Data Log [ref. a, ch. 2]
 - d. Distilling Plant Operating Log [ref. a, ch. 2]
 - e. Refrigeration/Air-Conditioning Equipment Operating Record [ref. a, ch. 2]
 - f. Fuel and Water Report [ref. a, ch. 2]
 - g. Fueling Memorandum [ref. a, ch. 2]
 - h. Navy Energy Usage Reporting System (NEURS) [ref. g]
 - i. Engineering Officer Night Order Book [ref. a, ch. 2]
 - j. Tag-Out Log [ref. b]
 - k. Damage Control (DC) Closure Log [ref. i; ref. j]
 - l. Boiler Water Chemistry/Feedwater Chemistry Log [ref. a, ch. 2]
 - m. Engineering Standing Orders [ref. f, ch. 8]
 - n. Propulsion Steam Turbine Operating Record [ref. a, ch. 2]
 - o. Boiler Room Operating Record [ref. a, ch. 2]
 - p. Bearing Record [ref. j]
 - q. Trouble Call Record [ref. j]
 - r. Steaming Orders [ref. a, ch. 2]
 - s. Boiler Tube Casualty Report [ref. a, ch. 2]
 - t. NAVSEA Technical Manual Deficiency Evaluation Report (TMDER) NAVSEA Form 9086/10 [ref. i]
 - u. Monthly boiler water treatment log package [ref. a, ch. 2]

112 **ENGINEERING ADMINISTRATION FUNDAMENTALS (CONT'D)**

112.12 State the information available in the following publications:

- a. Engineering Operational Sequencing System (EOSS) [ref. a, ch. 4]
- b. Engineering Operational Casualty Control (EOCC) Procedures [ref. a, ch. 4]
- c. Engineering Operational Procedures (EOP) [ref. a, ch. 4]
- d. Engineering Department Organization Manual (EDORM) [ref. e, ch. 1]
- e. Class Advisory Notebook [ref. i]

.13 State the purpose of the following:

- a. Electrical Safety Program [ref. h, ch. B7]
- b. Tag-Out Program [ref. h, ch. B11]
- c. Out-of-Commission Log [ref. f, ch. 8]
- d. Environmental and Natural Resources Program [ref. k]
- e. Fuel Quality Management Program [ref. e, ch. 4]
- f. Lube Oil Quality Management Program [ref. e, ch. 4]
- g. Damage Control Training Team (DCTT) [ref. m, ch. 3]
- h. Engineering Casualty Control Training Team (ECCTT, formerly ECCET) [ref. c, ch. 9]
- i. Gas-Free Engineer [ref. h, ch. B8; ref. d]
- j. Gage Calibration Program [ref. l]
- k. Hearing Conservation Program [ref. h, ch. B4]
- l. Heat Stress Program [ref. h, ch. B2]
- m. Physical Security Program [ref. e, ch. 3]
- n. Hazardous Material/Control Program [ref. h, chs. B3, C23]
- o. Sight Conservation Program [ref. h, ch. B5]
- p. Asbestos Control Program [ref. h, ch. B1]
- q. Personnel protective clothing and equipment [ref. h, ch. B12]

.14 Explain the following as applied to the equipment Safety Tag-Out Program:

- a. Duties of authorizing officer, person attaching tag, person checking tag and repair activity [ref. b]
- b. Use of caution tag [ref. b]
- c. Use of danger tag [ref. b]
- d. Out-of-calibration label [ref. b]
- e. Out-of-commission label [ref. b]
- f. Location and custody of Tag-Out Log and software on your ship [See local instruction]
- g. Function and use of Instrument Log [ref. b]
- h. Function of Tag-Out Log audit [ref. b]
- i. Equipment/conditions requiring Commanding Officer's permission [See local instructions]

.15 Explain your ship's Restricted Maneuvering Doctrine. [See local instructions]

113 HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M) PROGRAM FUNDAMENTALS

References:

- [a] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
 - [b] Local Instructions
-

113.1 Explain/define the following:

- a. Hazardous material (HM) [ref. a, ch. B3]
- b. Used or excess HM [ref. a, ch. B3]
- c. HM labeling requirements [ref. a, ch. B3]
- d. Used HM labeling requirements [ref. a, ch. B3]
- e. Material safety data sheet (MSDS) [ref. a, ch. B3]
- f. DOD HMIS [ref. a, ch. B3; ref. b]

.2 Explain where the documents are located: [ref. b]

- a. Hazardous Material Information System (HMIS) for MSDSs
- b. Ship's Hazardous Material List (SHML)
- c. List of authorized HM storage locations
- d. HM Inventory results
- e. Hazardous Material User's Guide (HMUG)

.3 Discuss the duties and responsibilities of the following: [ref. a, ch. B3]

- a. Safety Officer
- b. HM Coordinator
- c. Division Officer
- d. Work Center Supervisor
- e. Individual crew members

.4 Discuss the procedures for disposal of excess HM. [ref. a, ch. B3]

.5 What are the restrictions on stowage of flammable liquids in machinery spaces? [ref. a, ch. C23]

.6 What are the restrictions on HM allowed to be stowed in the work center? [ref. a, ch. C23]

.7 What are the requirements for collection of excess and used HM? [ref. a, ch. B3]

.8 What are the restrictions on open purchase of HM? [ref. a, ch. B3]

.9 What are the training requirements for individual crew members on the HM program? [ref. a, ch. B3]

**113 HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M) PROGRAM FUNDAMENTALS
 (CONT'D)**

200 INTRODUCTION TO SYSTEMS

200.1 BASIC BUILDING BLOCKS

In this section, the equipment is broken down into smaller, more comprehensible, functional *systems* as the basic building blocks in the learning process. Each system is written to reflect specific watchstation requirements by identifying the equipment most relevant to one or more designated watchstanders. The less complex systems may be identified and covered quickly or relegated to a lower priority to permit greater emphasis on more significant or complex systems.

200.2 COMPONENTS AND COMPONENT PARTS

For learning purposes each system is disassembled into two levels. Systems have *components* and components have *parts*. Do not expect to see every item which appears on a parts list to be in the PQS. Only those items which must be understood for operation/maintenance are listed. Normally a number of very broad (overview) systems are disassembled into their components or parts with the big picture as the learning goal. Items listed as components in such a system may then be analyzed as separate systems and broken down into components and parts. Example: the turbogenerators may be listed as a component of the Ship's Service Electrical Distribution System and then later detailed as an individual system for closer study.

200.3 FORMAT

Each system is organized within the following format:

- It lists the references to be used for study and asks you to explain the function of the system.
- It asks for the static facts of *what* or *where* the components and component parts are in relation to the system.
- It directs attention to the dynamics of *how* the component and component parts operate to make the system function.
- It specifies the parameters that must be immediately recalled.
- It requires study of the relationship between the system being studied and other systems or areas.
- It requires discussion of safety devices which protect the system, as well as unique safety precautions that apply to personnel and equipment.

200.4 HOW TO COMPLETE

The systems you must complete are listed in the Prerequisites section of each watchstation. When you have mastered one or more systems, contact your Qualifier. The Qualifier will give you an oral examination on each system and, if satisfied you have sufficient knowledge of the system, will sign the appropriate system line items. You will be expected to demonstrate through oral or written examination a thorough understanding of each system required for your watchstation.

201 BOILER CHEMICAL INJECTION SYSTEM

References:

- [a] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 [b] Engineering Operational Sequencing System (EOSS)
 [c] Propulsion Plant Manual (PPM)
 [d] NAVEDTRA 12960, Principles of Naval Engineering
-

201.1 FUNCTION

201.1.1 What is the function of this system? [ref. a, sec. 21]

201.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. What are the safety/protective devices for this component/component part?

		<u>A</u>	<u>B</u>
201.2.1	Injection tank [ref. a, sec. 22]	X	X
.2	Tank vent valve [ref. a, sec. 22]	X	
.3	Line stop valve [ref. d, ch. 18]	X	
.4	Main feed check valve [ref. d, ch. 18]	X	X
.5	Injection tank pressurizing line valve [ref. a, sec. 22]	X	

201.3 PRINCIPLES OF OPERATION

201.3.1 How do the components work together to achieve the system's function? [ref. a, sec. 22]

- .2 Draw a diagram of this system and label. [ref. a, secs. 22, 29, 30; refs. b, c]
- .3 Using a diagram of the system, show the path from the deaerating feed tank (DFT) to the chemical injection tank and then to the boilers [ref. a, secs. 22, 29, 30; ref. b]

201 BOILER CHEMICAL INJECTION SYSTEM (CONT'D)

- 201.4 PARAMETERS/OPERATING LIMITS
- 201.4.1 What are the normal operating time limits for chemical injection?
[ref. a, sec. 22]
- 201.5 SYSTEM INTERFACE - None to be discussed
- 201.6 SAFETY PRECAUTIONS
- 201.6.1 What special safety precautions apply to handling chemicals?
[ref. a, sec. 25]
- .2 What safety precautions must be observed when operating this
 system? [ref. a, sec. 22]

202 CONTINUOUS TREATMENT SYSTEM

Reference:

[a] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual

202.1 FUNCTION

202.1.1 What is the function of this system? [sec. 31]

202.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. What are the modes of operation or control?
- C. What are the safety/protective devices for this component/component part?
- D. What are the probable indications if this component fails?
- E. What is the source of control signals?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
202.2.1	Piercing apparatus [sec. 31]	X		X	X	
.2	Trisodium ethylenediaminetetracetate trihydrate (EDTA) [A: sec. 31] [C: sec. 25]	X		X		
.3	Hydrazine [sec. 31]	X		X		
.4	Trisodium phosphate [A: sec. 31] [C: sec. 25]	X		X		
.5	Disodium phosphate [A: sec. 31] [C: sec. 25]	X		X		
.6	Morpholine [sec. 31]	X		X		
.7	Mixing tank [sec. 31]	X		X	X	
.8	Control panel [sec. 31]	X	X	X	X	X
.9	Continuous blowdown [sec. 31]	X	X			
.10	Hydrazine locker [sec. 31]	X	X	X		

202 CONTINUOUS TREATMENT SYSTEM (CONT'D)

202.3 PRINCIPLES OF OPERATION

202.3.1 How do the components work together to achieve the system's function? [sec. 31]

.2 Draw a diagram of this system.[sec. 31]

.3 Using a diagram of the system, show the path of hydrazine from the piercing apparatus to the deaerating feed tank (DFT). [sec. 31]

202.4 PARAMETERS/OPERATING LIMITS

For the items listed, answer the following questions: [sec. 31]

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?
- D. What is the alarm set point?

		A	B	C	D
202.4.1	Nitrogen pressure	X	X		
.2	Tank level control	X			X
.3	Continuous blowdown	X	X	X	

202.5 SYSTEM INTERFACE

202.5.1 How do the following outside influences affect the operation of this system: [sec. 31]

- a. Loss of feed system
- b. Loss of continuous blowdown
- c. Loss of electrical power
- d. Loss of main condensate

202.6 SAFETY PRECAUTIONS

202.6.1 What safety precautions must be observed when operating this system? [sec. 31]

.2 What special safety precautions apply to chemicals? [sec. 31]

203 BROMINE FEED SYSTEM

References:

- [a] NAVSEA S9086-SE-STM-010, Naval Ships' Technical Manual, ch. 533
 - [b] NAVMED P-5010-1, Manual of Naval Preventive Medicine, ch. 6
 - [c] Engineering Operational Sequencing System (EOSS)
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203.1 FUNCTION

- 203.1.1 What is the function of this system? [ref. a, ch. 3]

203.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the function for each:

- 203.2.1 Test kit [ref. a, ch. 4]
- .2 Bromine Cartridge [ref. a, ch. 3]

203.3 PRINCIPLES OF OPERATION

- 203.3.1 Draw a diagram of this system. [ref. c]
- .2 Using a diagram of the system, show the path of: [ref. c]
 - a. Potable water from the potable water tank to the brominator
 - b. Potable water from the brominator to the potable water tank
- .3 What indications will you receive if the system is malfunctioning? [ref. a, sec. 4]

203.4 PARAMETERS/OPERATING LIMITS

For the item listed answer the following questions:

- A. What is the normal operating value?
- B. What are the allowable operating limits?

- 203.4.1 Bromine level [ref. a, ch. 3]

203.5 SYSTEM INTERFACE

- 203.5.1 How does this system interface with the Potable Water Service? [ref. b]

203 BROMINE FEED SYSTEM (CONT'D)

203.6 SAFETY PRECAUTIONS

203.6.1 What special safety precautions apply to: [ref. b]

- a. Storage of cartridges
- b. Replacement of cartridges

.2 What safety precautions must be observed when handling bromine cartridges? [ref. a, sec. 3]

204 FEEDWATER FILLING AND TRANSFER SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
 - [b] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [c] NAVEDTRA 12001, Fireman
 - [d] Propulsion Plant Manual (PPM)
 - [e] NAVSEA S9086-HZ-STM-010, Naval Ships' Technical Manual, ch. 255, vol. 1
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204.1 FUNCTION

204.1.1 What is the function of this system? [ref. e, sec. 2]

204.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. What are the probable indications if this component fails?

		<u>A</u>	<u>B</u>
204.2.1	Make up/reserve feed tank [ref. b sec. 21]	X	
.2	Emergency/feed transfer pump [ref. e, sec. 2]	X	
.3	Tank level indicators [ref. c, ch. 11]	X	
.4	Salinity/conductivity indicator [ref. b, sec. 24]	X	X
.5	Relief valves [ref. c, ch. 9]	X	
.6	Demineralizer [A: ref. b, glossary] [B: ref. b, sec. 21]	X	X

204.3 PRINCIPLES OF OPERATION

204.3.1 Draw a diagram of this system. [ref. a]

- .2 Using a diagram of the system, show the path of feedwater transfer from the inlet of demineralizer to the reserve feed tank. [ref. a]

204 FEEDWATER FILLING AND TRANSFER SYSTEM (CONT'D)

204.4 PARAMETERS/OPERATING LIMITS

For the items listed, answer the following questions:

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?
- D. What is the physical location of the indicators?
- E. What is the alarm set point?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
204.4.1	Pump discharge pressure [ref. a]	X	X	X	X	X
.2	Relief valve lifting pressure [ref. d]			X		
.3	Make up feed salinity/conductivity indicator [A-B: ref. b, sec. 22] [C-E; ref. a]	X	X	X	X	X
.4	Distillate salinity/conductivity indicator [A-B: ref. b, sec. 22] [C-E: ref. a]					
.5	Sample temperature [ref. b, sec. 26]			X		
.6	Low pressure air pressure [ref. a]	X	X	X	X	X

204.5 SYSTEM INTERFACE

- 204.5.1 How do the following outside influences affect the operation of this system: [ref. b, sec. 22]
- a. Operation of distilling plant
 - b. Operation of Condensate System
 - c. Loss of electrical power
- .2 How does this system interface with the Main/Auxiliary Condensate System [ref. b, sec. 22]

204.6 SAFETY PRECAUTIONS

- 204.6.1 What safety precautions must be observed when operating this system? [ref. e, sec. 3]

205 MAIN/AUXILIARY CONDENSATE SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
- [b] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
- [c] NAVSEA S9086-HY-STM-010, Naval Ships' Technical Manual, ch. 254
- [d] Propulsion Operating Guide (POG)
- [e] NAVSEA S9086-HZ-STM-010, Naval Ships' Technical Manual, ch. 255, vol. 1
- [f] NAVSEA S9086-HZ-STM-020, Naval Ships' Technical Manual, ch. 255, vol. 2

205.1 FUNCTION

205.1.1 What is the function of this system? [ref. e, sec. 2]

205.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. What are the sources of power?
- C. What are the modes of operation or control?
- D. What are the safety/protective devices for this component/component part?
- E. What are the probable indications if this component fails?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
205.2.1	Condenser hot well [ref. c, ch. 2]	X				
.2	Condensate pump [ref. e, sec. 2]	X	X			
.3	Deaerating feed tank (DFT) [A, D: ref. f, sec. 5] [C: ref. f, sec. 8] [E: ref. e, sec. 2]	X		X	X	X
.4	Air ejectors/vacuum pumps [A: ref. e, sec. 2] [D-E: ref. c, sec. 5]	X			X	X
.5	Low pressure/freshwater drain tank [ref. e, sec. 2]	X		X		
.6	Salinity/conductivity indicators [A, D-E: ref. b, sec. 22] [C: ref. b, sec. 26]	X		X	X	X
.7	Morpholine injector [ref. b, sec. 21]	X				X
.8	Gland exhaust condensers [ref. e, sec. 2]	X				

205 MAIN/AUXILIARY CONDENSATE SYSTEM (CONT'D)

205.3 PRINCIPLES OF OPERATION

- 205.3.1 How do the components work together to achieve the system's function? [ref. e, sec. 2]
- .2 Draw a diagram of this system. [ref. a]
- .3 What indications will you receive if the system is malfunctioning? [ref. c, sec. 2]

205.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions:

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?

		<u>A</u>	<u>B</u>	<u>C</u>
205.4.1	Condensate salinity/conductivity indicator [ref. b, sec. 22]	X	X	X
.2	Condenser vacuum [ref. c, sec. 2]	X	X	X
.3	DFT level [ref. e, sec. 2]	X		
.4	DFT temperature [ref. f, sec. 6]	X		

205.5 SYSTEM INTERFACE

- 205.5.1 How do the following outside influences affect the operation of this system:
- a. Variations in auxiliary exhaust pressure [ref. c, sec. 2]
- b. Variations in high pressure drains pressure [ref. f, sec. 8]
- c. Loss of electrical power [ref. a]
- 205.5.2 How does this system interface with the following:
- a. Main Feed System [ref. b, sec. 22]
- b. Feedwater Filling and Transfer System [ref. e, sec. 2]

205 MAIN/AUXILIARY CONDENSATE SYSTEM (CONT'D)

205.6 SAFETY PRECAUTIONS

205.6.1 What special safety precautions apply to stowage/ handling of
morpholine? [ref. b, sec. 25]

206 POTABLE WATER SERVICE AND TRANSFER SYSTEM

References:

- [a] Propulsion Plant Manual (PPM)
 - [b] NAVSEA S9086-RH-STM-010, Pumps, ch. 503
 - [c] Engineering Operational Sequencing System (EOSS)
 - [d] NAVSEA S9086-SE-STM-010, Naval Ships' Technical Manual, ch. 533
 - [e] NAVMED P-5010-6, Manual of Naval Preventive Medicine, ch. 6
 - [f] NAVEDTRA 12960, Principles on Naval Engineering
 - [g] NAVSEA S9086-SN-STM-010, Naval Ships' Technical Manual, ch. 541
 - [h] NAVEDTRA 12001, Fireman
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206.1 FUNCTION

206.1.1 What is the function of this system? [ref. d, ch. 2]

206.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. What are the modes of operation or control?
- C. What are the safety/protective devices for this component/component part?

		<u>A</u>	<u>B</u>	<u>C</u>
206.2.1	Potable water storage tanks [A: ref. f, ch. 2] [C: ref. d, ch. 2]	X		X
.2	Potable water pumps [ref. d, ch. 2]		X	
.3	Priming pumps [ref. b, ch. 2]	X	X	X
.4	Piping and valves [ref. d, ch. 2]		X	
.5	Relief valves [ref. d, ch. 2]		X	
.6	Sounding tubes [ref. g, ch. 9]		X	
.7	Tank level indicators [ref. h, ch. 11]		X	

206.3 PRINCIPLES OF OPERATION

206.3.1 How do the components work together to achieve the system's function? [ref. d, ch. 2]

206 POTABLE WATER SERVICE AND TRANSFER SYSTEM (CONT'D)

206.3.2 Draw a diagram of this system. [ref. c]

.3 Using a diagram, indicate alignment for the following: [ref. c]

- a. Receiving potable water
- b. Transferring potable water
- c. Ship's service normal distribution

206.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions: [ref. c]

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?
- D. What is the physical location of the indicators?

		A	B	C	D
206.4.1	Pump discharge pressure	X	X	X	X
.2	Relief valve lifting pressure	X		X	

206.5 SYSTEM INTERFACE

206.5.1 How does this system interface with the Bromine Feed System?
[ref. d, ch. 3]

206.6 SAFETY PRECAUTIONS

206.6.1 What safety precautions must be observed when operating this system? [ref. d, ch. 3]

207 BOILER SAMPLING SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
[b] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2

207.1 FUNCTION

- 207.1.1 What is the function of this system? [ref. b, sec. 26]

207.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss both questions for each:

- A. What is its function?
B. What are the probable indications if this component fails?

- 207.2.1 Boiler sample cooler [A: ref. b, sec. 26] [B: ref. b, sec. 24]
.2 Cooling water valves [ref. b, sec. 25]
.3 Desuperheater sample cooler [A: ref. b, sec. 26] [B: ref. b, sec. 24]

207.3 PRINCIPLES OF OPERATION

- 207.3.1 Draw a diagram of this system. [ref. a]
.2 What is the sequence of events for obtaining a boiler/desuperheater sample? [ref. b, sec. 26]

207.4 PARAMETERS/OPERATING LIMITS

- 207.4.1 Answer the following questions for sample temperature: [ref. b, ch. 26]
A. What is the allowable operating limit?
B. Where are the parameters sensed or monitored?

207.5 SYSTEM INTERFACE

- 207.5.1 How do variations in cooling medium temperature affect the operation of this system? [ref. b, sec. 24]

207.6 SAFETY PRECAUTIONS

- 207.6.1 What safety precautions must be observed when operating this system? [ref. b, sec. 26]

208 DEAERATING FEED TANK (DFT) SAMPLING SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
[b] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol 2
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208.1 FUNCTION

- 208.1.1 What is the function of this system? [ref. b, sec. 26]

208.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss both questions for each:

- A. What is its function?
B. What are the probable indications if this component fails?

- 208.2.1 Deaerated feed tank (DFT) sample cooler [A: ref. b, sec. 2] [B: ref. b, sec. 24]
.2 Cooling water valves [A: ref. b, sec. 26] [B: ref. b, sec. 25]
.3 Sample cooler valves [ref. b, sec. 24]

208.3 PRINCIPLES OF OPERATION

- 208.3.1 Draw a diagram of this system. [ref. a]
.2 What is the sequence of events for obtaining a DFT sample for:
a. pH chloride/hardness [ref. b, sec. 26]
b. Dissolved oxygen [ref. b, sec. 26]
c. Feedwater hydrazine [ref. b, sec. 31]
.3 What indications will you receive if the system is malfunctioning? [ref. b, sec. 24]

208.4 PARAMETERS/OPERATING LIMITS

For the item listed answer the following questions:

- A. What is the allowable operating limit?
B. Where are the parameters sensed or monitored?

- 208.4.1 Sample temperature [ref. b, sec. 26]

208 DEAERATING FEED TANK (DFT) SAMPLING SYSTEM (CONT'D)

208.5 SYSTEM INTERFACE

208.5.1 How do variations in cooling medium temperature affect the operation of this system? [ref. b, sec. 24]

208.6 SAFETY PRECAUTIONS

208.6.1 What safety precautions must be observed when operating this system? [ref. b, sec. 25]

209 MAIN FEED SYSTEM

References:

- [a] NAVSEA S9086-HZ-STM-010, Naval Ships' Technical Manual, ch. 255
 - [b] NAVEDTRA 12140, Boiler Technician 3 & 2
 - [c] NAVEDTRA 12001, Fireman
 - [d] NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [e] Engineering Operational Sequencing System (EOSS)
 - [f] Propulsion Plant Manual (PPM)
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209.1 FUNCTION

209.1.1 What is the function of this system? [ref. a, ch. 2]

209.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. What are the safety/protective devices for this component/component part?
- C. What are the probable indications if this component fails?

		<u>A</u>	<u>B</u>	<u>C</u>
209.2.1	Main feed pump [ref. b, ch. 4]	X	X	
.2	Main/emergency feed booster pump [ref. b, ch. 4]	X	X	
.3	Relief valves [ref. c, ch. 9]	X		
.4	Deaerating feed tank (DFT) [A: ref. c, ch. 3] [B: ref. a, ch. 5] [C: ref. d, ch. 23]	X	X	X

209.3 PRINCIPLES OF OPERATION

209.3.1 How do the components work together to achieve the system's function? [ref. a, ch. 2]

.2 Draw a diagram of this system. [ref. e]

209 MAIN FEED SYSTEM (CONT'D)

209.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions:

- A. What is the normal operating values?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?
- D. What is the physical location of the indicators?
- E. What is the alarm set point?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
209.4.1	Main feed booster pump pressure [ref. e]	X	X	X	X	X
.2	Main feed pump discharge pressure [ref. e]	X	X	X	X	X
.3	Relief valve setting [ref. f]	X	X	X		

209.5 SYSTEM INTERFACE

209.5.1 How do the following outside influences affect the operation of this system: [ref. e]

- a. Boiler Chemical Injection System
- b. Main/Auxiliary Condensate System
- c. Continuous Treatment System

209.6 SAFETY PRECAUTIONS

209.6.1 What safety precautions must be observed when aligning feed system for chemical injection? [ref. d, ch. 25]

210 FUEL OIL FILLING, TRANSFER AND STORAGE SYSTEM

References:

- [a] NAVSEA S9086-SN-STM-002, Naval Ships' Technical Manual, ch. 541
 - [b] NAVEDTRA 12960, Principles of Naval Engineering
 - [c] Engineering Operational Sequencing System (EOSS)
 - [d] Propulsion Plant Manual (PPM)
 - [e] NAVEDTRA 12001, Fireman
 - [f] NAVEDTRA 10564, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, vol. 2
 - [g] NAVSEA S9086-T8-STM-010, Naval Ships' Technical Manual, ch. 593
 - [h] OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program for Forces Afloat
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210.1 FUNCTION

210.1.1 What is the function of this system? [ref. b, ch. 9]

210.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the modes of operation or control?
- D. What are the safety/protective devices for this component/component part?
- E. What protection is provided by this component/ component part?
- F. What are the probable indications if this component fails?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
210.2.1	Fueling station [A: ref. b, ch. 9] [B: ref. c]	X	X				
.2	Filling/transfer piping and valves [A: ref. b, ch. 9] [B: ref. c]		X	X			
.3	Storage tanks [A: ref. b, ch. 9] [B: ref. c]		X	X			
.4	Service tanks [A: ref. b, ch. 9] [B: ref. c]		X	X			
.5	Contaminated tanks [A: ref. b, ch. 9] [B: ref. c]		X	X			
.6	Suction/filling manifolds [A: ref. b, ch. 18] [B: ref. c]		X	X			
.7	Transfer pumps [A: ref. b, ch. 9] [B-C: ref. c]		X	X	X		

210 FUEL OIL FILLING, TRANSFER AND STORAGE SYSTEM (CONT'D)

	A	B	C	D	E	F
210.2.8 Tank level indicators (TLIs) [ref. e, ch. 11]	X					
.9 Strainers [A, E: ref. b, ch. 18] [B, F: ref. c]	X	X			X	X
.10 Ballast and deballast seawater compensating [A: ref. b, ch. 9] [B: ref. c]	X	X				
.11 Tank vents [A, E: ref. a, sec. 9] [B: ref. c]	X	X			X	
.12 Sounding tubes [A, D: ref. a, sec. 9] [B: ref. c]	X	X		X		
.13 Filter separators [A, E: ref. a, sec. 9] [B: ref. c]	X	X			X	
.14 Relief valves [A: ref. e, ch. 9] [B: ref. c]	X	X				
.15 Fuel oil purifier [A: ref. a, sec. 9] [B, D: ref. c]	X	X		X		
.16 Compensating system/Leslie regulators [A: ref. a, sec. 3] [B, F: ref. c]	X	X				X
.17 Fuel oil system control console [A, C-D: ref. f, sec. 9] [B, F: ref. c]	X	X	X	X		X
.18 Fuel oil local control panel [A, D: ref. f, sec. 9] [B, ref. c]	X	X		X		
.19 Overflow tanks [A: ref. b, ch. 9] [B: ref. c]	X	X				
.20 Remote operators [A: ref. e, ch. 18] [B: ref. c]	X	X				
210.3 PRINCIPLES OF OPERATION						
210.3.1 How do the components work together to achieve the system's function? [ref. b, ch. 9]						
.2 Draw a diagram of this system. [ref. c]						

210 FUEL OIL FILLING, TRANSFER AND STORAGE SYSTEM (CONT'D)

210.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions:

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?
- D. What is the physical location of the indicators?
- E. What is the alarm set point?

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
210.4.1	Service tank level [ref. c]	X	X	X		X
.2	Storage tank level [ref. c]		X	X	X	X
.3	Contaminated tank level [ref. c]		X	X	X	X
.4	Strainer differential pressure [ref. c]		X	X	X	X
.5	Pump discharge pressure [ref. c]		X	X	X	X
.6	Relief valve lifting pressure [ref. d]		X			
.7	Pump rating (GPM) [ref. d]		X			

210.5 SYSTEM INTERFACE

- 210.5.1 How does this system interface with the Fuel Oil Service System?
[ref. b, ch. 9]

210.6 SAFETY PRECAUTIONS

- 210.6.1 What safety precautions apply to:
- a. In port fuel transfer [ref. g, sec. 3]
 - b. Shipboard fuel [ref. h, ch. D6]

211 BALLAST, DEBALLAST AND STRIPPING SYSTEM

References:

- [a] Propulsion Plant Manual (PPM)
 - [b] Ship's Information Book (SIB)
 - [c] Engineering Operational Sequencing System (EOSS)
 - [d] NAVSEA S9086-SN-STM-002, Naval Ships' Technical Manual, ch. 541
 - [e] NAVEDTRA 12960, Principles of Naval Engineering (PNE)
 - [f] NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual, ch. 505
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211.1 FUNCTION

211.1.1 What is the function of this system? [ref. d, sec. 3]

211.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the sources of power?
- D. What are the safety/protective devices for this component/component part?
- E. What protection is provided by this component/ component part?
- F. What are the probable indications if this component fails?

		A	B	C	D	E	F
211.2.1	Fuel oil service and storage tanks [A, D: ref. d, sec. 5] [B: ref. a]	X	X		X		
.2	Pumps [A, D: ref. f, sec. 19] [C: ref. a]	X		X	X		
.3	Firemain connections [A: ref. f, sec. 9] [B, F: ref. c]	X	X				X
.4	Eductor [A: ref. f, sec. 19] [B: ref. c] [D: ref. f, sec. 10]	X	X		X		
.5	Contaminated oil tank [A: ref. d, sec. 6] [B, D: ref. c]		X	X		X	
.6	Tank level indicators (TLIs) [A: ref. d, sec. 9] [B: ref. c]		X	X			
.7	Sounding tubes [ref. d, sec. 9]		X	X		X	
.8	Remote operators [ref. f, sec. 18]		X	X	X	X	X

211 BALLAST, DEBALLAST AND STRIPPING SYSTEM (CONT'D)

211.3 PRINCIPLES OF OPERATION

211.3.1 How do the components work together to achieve the system's function? [ref. e, ch. 9]

.2 Draw a diagram of this system. [ref. c]

.3 Using a diagram of the system, discuss the alignments for ballasting, deballasting and stripping tanks. [ref. c]

211.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions: [ref. c]

- A. What are the allowable operating limits?
- B. Where are the parameters sensed or monitored?
- C. What is the physical location of the indicators?
- D. What is the alarm set point?

211.4.1 Firemain pressure

.2 Tank level

.3 Pump discharge pressure

211.5 SYSTEM INTERFACE

211.5.1 How do the following outside influences affect the operation of this system: [ref. c]

- a. Loss of electrical power
- b. Loss of firemain
- c. Loss of steam pressure (for turbine driven fire pump)

211.6 SAFETY PRECAUTIONS

211.6.1 What safety precautions must be observed when operating this system? [ref. d, sec. 1]

212 LUBE OIL TRANSFER AND PURIFICATION SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
 [b] NAVSEA S9086-H7-STM-010, Naval Ships' Technical Manual, ch. 262
 [c] NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual, ch. 505
 [d] NAVEDTRA 12001, Fireman
 [e] NAVSEA S9086-WK-STM-010, Naval Ships' Technical Manual, ch. 670
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212.1 FUNCTION

212.1.1 What is the function of this system? [ref. b, sec. 3]

212.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. Where is it located?
 C. What are the sources of power?
 D. What are the modes of operation or control?
 E. What are the safety/protective devices for this component/component part?
 F. What protection is provided by this component/ component part?
 G. What are the probable indications if this component fails?

		A	B	C	D	E	F	G
212.2.1	Lube oil sump [A: ref. d, glossary] [E, G: ref. b, sec. 3]	X				X		X
.2	Pumps [ref. b, sec. 3]	X				X		X
.3	Piping and valves [A: ref. d, ch. 9] [E, G: ref. b, sec. 3]	X				X		X
.4	Lube oil purifier [ref. b, sec. 3]	X			X			X
.5	Lube oil storage tanks [ref. b, sec. 3]	X						
.6	Lube oil settling tanks [ref. b, sec. 3]	X						
.7	Lube oil heater [ref. b, sec. 3]	X	X					X
.8	Lube oil cooler [ref. b, sec. 3]	X			X		X	X
.9	Tank level indicators (TLIs) [ref. d, ch. 11]	X	X	X			X	X
.10	Relief valves [ref. c, sec. 9]	X				X		

212 LUBE OIL TRANSFER AND PURIFICATION SYSTEM (CONT'D)

212.3 PRINCIPLES OF OPERATION

212.3.1 How do the components work together to achieve the system's function? [ref. b, sec. 3]

212.3.2 Draw a diagram of this system. [ref. a]

.3 Using a diagram of this system, indicate the alignment for the following: [ref. a]

- a. Receiving lube oil
- b. Transferring lube oil
- c. Purifying lube oil

212.4 PARAMETERS/OPERATING LIMITS

For the items listed answer the following questions:

- A. What is the normal operating value?
- B. What are the allowable operating limits?
- C. Where are the parameters sensed or monitored?

		A	B	C
212.4.1	Pump discharge pressure [A: ref. b, sec. 3] [B-C: ref. a]	X	X	X
.2	Lube oil temperature [A-B: ref. b, sec. 3] [C: ref. a]	X	X	X
.3	Pump (RPM/GPM) [ref. a]	X		X
.4	Relief valve setting [ref. a]		X	

212.5 SYSTEM INTERFACE

212.5.1 How does the Heating System affect the operation of this system? [ref. b, sec. 3]

212.6 SAFETY PRECAUTIONS

212.6.1 What safety precautions must be observed when operating this system? [ref. e, sec. 4]

213 FUEL OIL SERVICE SYSTEM

References:

- [a] NAVSEA 59086-6X-STM-020, Naval Ships' Technical Manual, ch. 220, vol. 2
 - [b] NAVEDTRA 10535, Boiler Technician 3 & 2
 - [c] Propulsion Operating Guide (POG)
 - [d] NAVSEA S9086-KE-STM-001, Naval Ships' Technical Manual, ch. 302
 - [e] Engineering Operational Sequencing System (EOSS)
 - [f] NAVSEA S9086-SN-STM-010, Naval Ships' Technical Manual
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213.1 FUNCTION

213.1.1 What is the function of this system? [ref. f, ch. 1]

213.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What protection is provided by this component/ component part?

		<u>A</u>	<u>B</u>	<u>C</u>
213.2.1	Service tanks	X	X	
	[A: ref. b, ch. 4] [B: ref. e]			
.2	Service pumps (steam)	X	X	
	[A: ref. f, ch. 1] [B: ref. e]			
.3	Pump motor controller	X		
	[ref. d, ch. 3]			
.4	Duplex strainer	X	X	X
	[A, C: ref. f, ch. 9] [B: ref. e]			
.5	Recirculating valve	X		
	[ref. f, ch. 5]			
.6	Three-way valve	X	X	
	[A: ref. b, ch. 11] [B: ref. e]			
.7	Quick-closing valve	X	X	X
	[A, C: ref. f, ch. 5] [B: ref. e]			
.8	Contaminated tanks	X		
	[ref. b, ch. 4]			
.9	Pump discharge relief valve	X	X	
	[ref. f, ch. 9]			

213 FUEL OIL SERVICE SYSTEM (CONT'D)

213.3 PRINCIPLES OF OPERATION

213.3.1 How do the components work together to achieve the system's function? [ref. f, ch. 5]

.2 Draw a diagram of this system. [ref. c]

213.4 PARAMETERS/OPERATING LIMITS - None to be discussed.

213.5 SYSTEM INTERFACE

213.5.1 How do variations in boiler firing rate affect the operation of this system? [ref. a, sec. 27]

.2 How does this system interface with Fuel Oil Storage Filling and Transfer System? [ref. f, ch. 5]

213.6 SAFETY PRECAUTIONS

213.6.1 What precautions apply to shifting fuel oil suction? [ref. e; ref. f, ch. 5]

213 FUEL OIL SERVICE SYSTEM (CONT'D)

300 INTRODUCTION TO WATCHSTATIONS

300.1 INTRODUCTION

The Watchstation section of your PQS is where you get a chance to demonstrate to your Qualifier that you can put the knowledge you have gained in the Fundamentals and Systems sections to use. This section allows you to practice the tasks required for your watchstation and to handle abnormal conditions and emergencies. Before starting your assigned tasks, you must complete the fundamentals and systems that pertain to the performance of that particular task. Satisfactory completion of all prerequisite watchstations, fundamentals and systems is required prior to achievement of final watchstation qualification.

300.2 FORMAT

Each watchstation in this section contains:

- A FINAL QUALIFICATION PAGE, which is used to obtain the required signatures for approval and recording of Final Qualification.
- A QUALIFICATION SUMMARY, which is used to record completion of all requirements for qualification at that watchstation, broken down as follows:
 - PREREQUISITES, items that must be certified as having been completed before you can begin qualification for a particular watchstation. Prerequisites may include schools, watchstation qualifications from other PQS booklets and other watchstation qualifications from this booklet. Prior to signing off each prerequisite line item, the Qualifier must verify completion from existing records. The date is the date of actual completion, not the sign-off date. No points or percentages are assigned for prerequisites.
 - FUNDAMENTALS, the required fundamentals from the 100 section of this PQS booklet and are in addition to fundamentals you may have completed for other watchstations. Normally all fundamentals must be completed and signed off here prior to starting the watchstation (section 300) tasks, however, the Qualifier has the option of allowing you to start selected watchstation tasks after completing the fundamentals pertaining to the performance of those particular tasks.
 - SYSTEMS, from the 200 section of this PQS booklet which are required for this watchstation and are in addition to systems required for prerequisite watchstations. Before starting assigned watchstation (section 300) tasks, you must complete the systems that pertain to those particular tasks. Satisfactory completion of all systems listed is required for Final Qualification.
 - WATCHSTATION Performance, which is the practical factors

portion of your qualification. The performance is broken down as follows:

Tasks (routine operating tasks that are performed frequently)
Infrequent Tasks
Abnormal Conditions
Emergencies
Training Watches

- A FINAL QUALIFICATION SECTION, which is used to obtain the required initials for approval and recording final qualification for each watchstation.

300.3 OPERATING PROCEDURES

The PQS deliberately makes no attempt to specify the procedures to be used to complete a task or to control or correct a casualty. The only proper sources of this information are the technical manuals, Engineering Operational Sequencing System (EOSS), Naval Air Training and Operating Procedures Standardization (NATOPS) or other policy-making documents prepared for a specific installation or a piece of equipment. Additionally, the level of accuracy required of a trainee may vary from school to school, ship to ship, and squadron to squadron based upon such factors as mission requirements. Thus, proficiency may be confirmed only through demonstrated performance at a level of competency sufficient to satisfy the Commanding Officer.

300.4 DISCUSSION ITEMS

Though actual performance of evolutions is always preferable to observation or discussion, some items listed in each watchstation may be too hazardous or time-consuming to perform or simulate. Therefore, you may be required to discuss such designated items with your Qualifier.

300.5 NUMBERING

Each Final Qualification is assigned both a watchstation number and a NAVEDTRA Final Qualification number. The NAVEDTRA number is to be used for recording qualifications in service and training records.

300.6 HOW TO COMPLETE

After completing the required fundamentals and systems applicable to a particular task, you may perform the task under the supervision of a qualified watchstander. If you satisfactorily perform the task and can explain each step, your Qualifier will sign you off for that task. After all line items have been completed, your Qualifier will verify Final Qualification by signing and dating the Final Qualification pages.

301 WATER KING (MAIN PROPULSION BOILER)

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors give away their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified WATER KING (MAIN PROPULSION BOILER)
(NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____

Supervisor

RECOMMENDED _____ DATE _____

Division Officer

RECOMMENDED _____ DATE _____

Department Head

QUALIFIED _____ DATE _____

Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

301 WATER KING (MAIN PROPULSION BOILER)

Estimated completion time: 19 weeks Total points this
watchstation: 100

301.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE THE FOLLOWING:

301.1.1 SCHOOLS:

Boiler Water/Feedwater Test and Treatment Basic Course (A-651-0119)

Completed _____
(Qualifier and Date)

Boiler Water/Feedwater Test and Treatment Supervisors Course ((A-651-0116) for Chelant or (A-651-0115) for Cophos)

Completed _____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

102 Water Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

103 Boiler Water Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

104 Feedwater/Condensate Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

301

WATER KING (MAIN PROPULSION BOILER) (CONT'D)

301.1.2 109 Physical Security Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

112 Engineering Administration

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

113 Hazardous Material Control and Management (HMC&M) Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

201 Boiler Chemical Injection

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

202 Continuous Treatment

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

204 Feedwater Filling and Transfer

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

301

WATER KING (MAIN PROPULSION BOILER) (CONT'D)

301.1.3 205 Main/Auxiliary Condensate

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

207 Boiler Sampling

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

208 Deaerating Feed Tank (DFT) Sampling

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

209 Main Feed

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

301.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Perform this task IAW EOSS/Naval Ships' Technical Manual, ch. 220, vol 2.

301.2.1	Draw boiler, condensate, feedwater, distillate and drain samples from all sources (2 times)	<u>A B C D E F</u> X X X X X X
---------	---------------------------------------------------------------------------------------------	-----------------------------------

(Signature and Date) (Signature and Date)

.2	Test boiler water for pH (cophos only) (2 times)	X X X X X X
----	--------------------------------------------------	-------------

(Signature and Date) (Signature and Date)

		A	B	C	D	E	F
301.2.3	Test boiler water for phosphate (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.4	Test boiler water for alkalinity and phosphate (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.5	Test boiler water for conductivity (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.6	Test boiler water for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.7	Test feedwater for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.8	Test feedwater for hardness (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.9	Test feedwater for pH (cophos with morphline only) (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.10	Test condensate for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						

	A	B	C	D	E	F
301.2.11 Test condensate for hardness (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.12 Test evaporator distillate for chloride (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.13 Test shore source feedwater before and during receiving operations (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.14 Test DFT for dissolved oxygen (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.15 Test feedwater for hydrazine (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.16 Recommend to EOW/Engineering Officer the action/treatment to be taken determined by the test results (2 times)	X	X	X		X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.17 Treat boiler as required by test results (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.18 Maintain appropriate logs (2 times)	X	X	X		X	X
_____ (Signature and Date)						
_____ (Signature and Date)						

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
301.2.19	Maintain sufficient and current supply of chemicals and reagents (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.20	Maintain current copy of Material Safety Data Sheets (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.21	Prepare reagents and required standards test (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.22	Operate morpholine injections systems as required (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.23	Calculate the percent of blowdowns (2 times)	X	X	X		X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.24	Calculate weight and prepare treatment chemicals for injection (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.25	Prepare continuous chemical treatment tank (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.26	Calculate theoretical conductivity (2 times)	X	X	X		X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						

		A	B	C	D	E	F
301.2.27	Check shelf life of stock chemicals (2 times)	X	X		X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.28	Calculate casualty dose of TSP (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.29	Calculate casualty dose of DSP (2 times)	X	X	X		X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.30	Calculate casualty dose of caustic soda (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.31	Test low pressure/freshwater drains (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.32	Calibrate pH meter from start-up through daily standardization (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.33	Inspect oil shack/shipboard laboratory (2 times)	X	X	X	X		X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.34	Perform a boiler lay-up inspection (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						

COMPLETED .2 AREA COMPRISES 18 PTS/18% OF WATCHSTATION.

301.3 INFREQUENT TASKS

For the infrequent tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters must be monitored?
- G. How are monitored parameters changed by this infrequent task?
- H. What conditions require this infrequent task?
- I. Perform or simulate this task IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
301.3.1	Rig to receive shore source feedwater (2 times)	X	X	X	X	X	X	X	X	X

(Signature and Date) (Signature and Date)

.2	Dispose of hazardous material/hazardous waste (2 times)	X	X	X		X			X	X
----	---------------------------------------------------------	---	---	---	--	---	--	--	---	---

(Signature and Date) (Signature and Date)

.3	Perform bicarbonate test on feedwater (2 times)	X	X	X		X	X	X	X	X
----	-------------------------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

.4	Change out demineralizer resin bed (2 times)	X	X	X		X	X	X	X	X
----	----------------------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

.5	Perform silica test (2 times)	X	X	X		X	X	X	X	X
----	-------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

COMPLETED .3 AREA COMPRISES 12 PTS/12% OF WATCHSTATION.

301.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this condition affect other operations/equipment/watchstations?
- G. What follow-up action is required?
- H. How is this condition properly documented?
- I. Perform or simulate the corrective/immediate action for this abnormal condition IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
301.4.1	Salinity/conductivity indicator malfunction (2 times)	X	X	X	X	X	X	X	X	X

(Signature and Date) (Signature and Date)

.2	pH meter malfunction (2 times)	X	X	X		X	X	X	X	X
----	--------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

.3	Conductivity meter malfunction (2 times)	X	X	X		X	X	X	X	X
----	------------------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

.4	Continuous conductivity meter malfunction (2 times)	X	X	X	X	X	X	X	X	X
----	-----------------------------------------------------	---	---	---	---	---	---	---	---	---

(Signature and Date) (Signature and Date)

.5	Chemical hideout (2 times)	X	X	X	X	X	X	X	X	X
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(Signature and Date) (Signature and Date)

301.4.6 Out of limits pH of feedwater (Morpholine ships only)(2 times)

X X X X X X X X X

(Signature and Date) (Signature and Date)

.7 Abnormal water conditions during plant start-up
(2 times)

X X X X X X X X X

(Signature and Date) (Signature and Date)

.8 Misalignment of injection system(s) (2 times)

X X X X X X X X X

(Signature and Date) (Signature and Date)

.9 Improper chemical addition (2 times)

X X X X X X X X X

(Signature and Date) (Signature and Date)

.10 Test/treatment chemical problems (2 times)

X X X X X X X X X

(Signature and Date) (Signature and Date)

COMPLETED .4 AREA COMPRISES 12 PTS/12% OF WATCHSTATION.

301.5 EMERGENCIES

For the emergency conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

301.5.1 Moderate contamination of boiler water (2 times)

(Signature and Date) (Signature and Date)

.2 Serious contamination of boiler water (2 times)

(Signature and Date) (Signature and Date)

.3 Significant damage of boiler water (2 times)

(Signature and Date) (Signature and Date)

.4 Carryover of boiler water (2 times)

(Signature and Date) (Signature and Date)

.5 Leakage of boiler water (2 times)

(Signature and Date) (Signature and Date)

.6 Boiler water in free caustic (2 times)

(Signature and Date) (Signature and Date)

301.4.7 Seawater contamination of feedwater/boiler water (2 times)

(Signature and Date) (Signature and Date)

.8 Shore water contamination of feedwater/boiler water (2 times)

(Signature and Date) (Signature and Date)

.9 Oil contamination of feedwater/boiler water (2 times)

(Signature and Date) (Signature and Date)

.10 High dissolved oxygen in feedwater (2 times)

(Signature and Date) (Signature and Date)

.11 Bicarbonate contamination in feedwater (2 times)

(Signature and Date) (Signature and Date)

.12 Other contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

.13 Silica contamination (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

301

WATER KING (MAIN PROPULSION BOILER) (CONT'D)

301.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

301.6.1 Normal (5 times)

(Signature and Date) (Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

301.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

301.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

302 WATER KING (AUXILIARY BOILER)/WASTE HEAT

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified WATER KING (AUXILIARY BOILER)/WASTE HEAT (NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____
SupervisorRECOMMENDED _____ DATE _____
Division OfficerRECOMMENDED _____ DATE _____
Department HeadQUALIFIED _____ DATE _____
Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

302 WATER KING (AUXILIARY BOILER)/WASTE HEAT

Estimated completion time: 18 weeks Total points this watchstation: 100

302.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE THE FOLLOWING:

302.1.1 SCHOOLS:

Nonpropulsion Boiler Water/Feedwater Course (A-652-0221)

Completed _____
(Qualifier and Date)

Auxiliary Boiler Operating School

Completed _____
(Qualifier and Date)FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED
PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL
WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

102 Water Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

103 Boiler Water Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

104 Feedwater/Condensate Chemistry

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

302.1.2 109 Physical Security

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

112 Engineering Administration

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

113 Hazardous Material Control and Management (HMC&M) Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

201 Boiler Chemical Injection

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

204 Feedwater Filling and Transfer

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

205 Main/Auxiliary Condensate

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

302

WATER KING (AUXILIARY BOILER)/WASTE HEAT (CONT'D)

302.1.3 207 Boiler Sampling

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

208 Deaerated Feed Tank (DFT) Sampling

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

209 Main Feed

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

302.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Perform this task IAW Naval Ships' Technical Manual, ch. 20, vol. 2.

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
302.2.1	Draw boiler, condensate, feedwater, distillate and drain samples from all sources (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.2	Test boiler water for alkalinity/phosphate (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.3	Test boiler water for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						

		A	B	C	D	E	F
302.2.4	Test boiler water for conductivity (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.5	Test feedwater for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.6	Test feedwater for hardness (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.7	Test condensate for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.8	Test condensate for hardness (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.9	Test evaporator distillate for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.10	Test shore source feedwater (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
.11	Recommend to EOW/Engineer Officer the action/treatment To be taken determined by test results (2 times)	X	X			X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						

	A	B	C	D	E	F
302.2.12 Treat boiler as required (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.13 Maintain appropriate logs (2 times)	X	X	X		X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.14 Maintain a sufficient and current supply of chemicals and reagents (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.15 Prepare reagents and conduct required standard test (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.16 Test low pressure/freshwater drains (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.17 Calculate the percent of blowdown (2 times)	X	X	X		X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.18 Calculate weight and prepare treatment chemicals for addition (2 times)	X	X	X	X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						
.19 Check shelf life of stock chemicals (2 times)	X	X		X	X	X
_____ (Signature and Date)						
_____ (Signature and Date)						

(Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

302.3 INFREQUENT TASKS

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters must be monitored?
- G. How are monitored parameters changed by this infrequent task?
- H. What conditions require this infrequent task?
- I. Perform or simulate this task IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

(Signature and Date) (Signature and Date)

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
302.3.2	Dispose of hazardous material/hazardous waste (2 times)	X	X	X		X			X	X

(Signature and Date) (Signature and Date)

.3	Perform bicarbonate test on feedwater (2 times)	X	X	X		X	X		X	X
----	-------------------------------------------------	---	---	---	--	---	---	--	---	---

(Signature and Date) (Signature and Date)

COMPLETED .3 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

302.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this condition affect other operations/equipment/watchstations?
- G. What follow-up action is required?
- H. How is this condition documented?
- I. Perform or simulate the corrective/immediate action for this abnormal condition IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
302.4.1	Salinity/conductivity indicator malfunction (2 times)	X	X	X	X	X	X	X	X	X

(Signature and Date) (Signature and Date)

.2	Conductivity meter malfunction (2 times)	X	X	X		X	X	X	X	X
----	------------------------------------------	---	---	---	--	---	---	---	---	---

(Signature and Date) (Signature and Date)

		A	B	C	D	E	F	G	H	I
302.4.3	Out of limits alkalinity of boiler water (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									
.4	Problems during boiler start-up (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									
.5	Misalignment of injection system (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									
.6	Improper chemical addition (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									
.7	Test/treatment chemical problems (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									
.8	Chemical hideout (2 times)	X	X	X	X	X	X	X	X	X
	_____ (Signature and Date)									

COMPLETED .4 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

302.5 EMERGENCIES

For the emergency conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW Naval Ships' Technical Manual, ch. 220, vol. 2.

302.5.1 Leakage of boiler water (2 times)

(Signature and Date) (Signature and Date)

.2 Seawater contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

.3 Shore water contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

.4 Oil contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

.5 Bicarbonate contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

.6 Other contamination of feedwater (2 times)

(Signature and Date) (Signature and Date)

302.5.7 High dissolved oxygen of feedwater (2 times)

(Signature and Date) (Signature and Date)

.8 Boiler water high/low alkalinity (2 times)

(Signature and Date) (Signature and Date)

.9 Boiler water high/low phosphate (2 times)

(Signature and Date) (Signature and Date)

.10 Boiler water high chloride (2 times)

(Signature and Date) (Signature and Date)

.11 Carryover of boiler water (2 times)

(Signature and Date) (Signature and Date)

.12 High dissolved oxygen in feedwater (2 times)

(Signature and Date) (Signature and Date)

.13 Failure of Continuous Chemical Injection System (waste heat boiler only) (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

302

WATER KING (AUXILIARY BOILER)/WASTE HEAT (CONT'D)

302.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

302.6.1 Normal (5 times)

(Signature and Date) (Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 13 PTS/13% OF WATCHSTATION.

302.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

302.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

303 WATER KING (DIESEL JACKET)

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified WATER KING (DIESEL JACKET)
(NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____

Supervisor

RECOMMENDED _____ DATE _____

Division Officer

RECOMMENDED _____ DATE _____

Department Head

QUALIFIED _____ DATE _____

Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

303 WATER KING (DIESEL JACKET)

Estimated completion time: 5 weeks Total points this watchstation: 100

303.1 PREREQUISITES

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

303.1.1 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

102 Water Chemistry

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

106 Diesel Engine Jacket Water Chemistry

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

109 Physical Security

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

112 Engineering Administration

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

303

WATER KING (DIESEL JACKET) (CONT'D)

303.1.1 113 Hazardous Material Control and Management (HMC&W) Program

Completed _____ 4 pts/4% of Watchstation
(Qualifier and Date)

303.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Perform this task IAW Naval Ships' Technical Manual, chs. 262, 233, 556.

		A	B	C	D	E	F
303.2.1	Maintain appropriate logs (2 times)	X	X			X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.2	Maintain necessary equipment and hardware for conductivity required tests (2 times)	X	X		X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.3	Draw samples (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.4	Test for freezing protection (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.5	Test for nalcool residual (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						

		A	B	C	D	E	F
303.2.6	Test for alkalinity (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.7	Test for chloride (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.8	Test jacket water using nalcool test strip (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.9	Recommend to EOOW/EDO the action/treatment to be taken (2 times)	X	X	X			X X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.10	Calculate nalcool 2000 dosage (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.11	Treat water (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
.12	Test soluble oil (2 times)	X	X	X	X	X	X
	_____ (Signature and Date)						
	_____ (Signature and Date)						
COMPLETED .2 AREA COMPRISES 26 PTS/26% OF WATCHSTATION.							
303.3	INFREQUENT TASKS - None to be discussed.						
303.4	ABNORMAL CONDITIONS - None to be discussed.						

303.5 EMERGENCIES

For the emergency conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW Naval Ships' Technical Manual, chs. 262, 233.

303.5.1 High chloride (2 times)

(Signature and Date) (Signature and Date)

.2 High/low alkalinity (2 times)

(Signature and Date) (Signature and Date)

.3 High/low chromate (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 21 PTS/21% OF WATCHSTATION.

303.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

303.6.1 Normal (5 times)

(Signature and Date) (Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 21 PTS/21% OF WATCHSTATION.

303

WATER KING (DIESEL JACKET) (CONT'D)

303.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

303.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

304 WATER KING (POTABLE WATER)

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified WATER KING (POTABLE WATER)
(NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____
SupervisorRECOMMENDED _____ DATE _____
Division OfficerRECOMMENDED _____ DATE _____
Department HeadQUALIFIED _____ DATE _____
Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

304 WATER KING (POTABLE WATER)

Estimated completion time: 10 weeks Total points this watchstation: 100

304.1 PREREQUISITES

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

304.1.1 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

102 Water Chemistry

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

105 Potable Water Chemistry

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

109 Physical Security

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

112 Engineering Administration

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

304

WATER KING (POTABLE WATER) (CONT'D)

304.1.1 113 Hazardous Material Control and Management (HMC&M) Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

304.1.2 SYSTEMS FROM THIS PQS:

203 Bromine Feed

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

206 Potable Water Service and Transfer

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

304.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters/operating limits must be monitored?
- G. Perform this task IAW Naval Ships' Technical Manual, ch. 220, vol. 2/NAVMED Instructions Water Supply Afloat, ch. 6/NSTM 533.

304.2.1	Test evaporator distillate for chloride (2 times)	<table border="0"><tr><td><u>A</u></td><td><u>B</u></td><td><u>C</u></td><td><u>D</u></td><td><u>E</u></td><td><u>F</u></td><td><u>G</u></td></tr><tr><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td>X</td><td>X</td></tr></table>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	X	X	X		X	X	X
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>										
X	X	X		X	X	X										

(Signature and Date) (Signature and Date)

.2	Receive or transfer water (2 times)	X X X X X X X
----	-------------------------------------	---------------

(Signature and Date) (Signature and Date)

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
304.2.3	Test potable water for free available chlorine and total bromine residue (2 times)							

	(Signature and Date)							

	(Signature and Date)							
.4	Recommend to EOOW/EDO the action/treatment to be taken (2 times)							

	(Signature and Date)							

	(Signature and Date)							
.5	Maintain necessary potable water/bromine logs (2 times)							

	(Signature and Date)							

	(Signature and Date)							
.6	Maintain a sufficient and current supply of water purification chemicals and hardware (2 times)							

	(Signature and Date)							

	(Signature and Date)							
COMPLETED .2 AREA COMPRISES 40 PTS/40% OF WATCHSTATION.								
304.3	INFREQUENT TASKS - None to be discussed.							
304.4	ABNORMAL CONDITIONS - None to be discussed.							

304.5 EMERGENCIES

For the emergency condition listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW NAVMED Instruction, Water Supply Afloat, ch. 6.

304.5.1 Contaminated potable water (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

304.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

304.6.1 Normal (5 times)

(Signature and Date) (Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

304.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

304.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

305 LUBE OIL KING

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors give away their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified LUBE OIL KING (NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____
Supervisor

RECOMMENDED _____ DATE _____
Division Officer

RECOMMENDED _____ DATE _____
Department Head

QUALIFIED _____ DATE _____
Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

305 LUBE OIL KING

Estimated completion time: 12 weeks Total points this watchstation: 100

305.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE THE FOLLOWING:

305.1.1 SCHOOL:

Petroleum Oil Lubrication Course (K8212142) (RECOMMENDED)

Completed _____
(Qualifier and Date)FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED
PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL
WATCHSTATION QUALIFICATION.

305.1.1 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

108 Lube Oil

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

109 Physical Security

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

305

LUBE OIL KING (CONT'D)

305.1.1 112 Engineering Administration

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

113 Hazardous Material Control and Management (HMC&M) Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

.2 SYSTEM FROM THIS PQS:

212 Lube Oil Transfer and Purification

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

305.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters/operating limits must be monitored?
- G. Perform this task IAW Naval Ships' Technical Manual, chs. 262, 556.

305.2.1	Maintain appropriate logs (2 times)	<table border="0"><tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td></tr><tr><td>X</td><td>X</td><td>X</td><td></td><td></td><td>X</td><td>X</td></tr></table>	A	B	C	D	E	F	G	X	X	X			X	X
A	B	C	D	E	F	G										
X	X	X			X	X										

(Signature and Date) (Signature and Date)

.2	Maintain necessary equipment and hardware for performance of required test (2 times)	<table border="0"><tr><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td>X</td><td>X</td></tr></table>	X	X	X		X	X	X
X	X	X		X	X	X			

(Signature and Date) (Signature and Date)

.3	Sample lube oil (2 times)	<table border="0"><tr><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td>X</td><td>X</td></tr></table>	X	X	X		X	X	X
X	X	X		X	X	X			

(Signature and Date) (Signature and Date)

		A	B	C	D	E	F	G
305.2.4	Test lube oil for fuel dilution (2 times)	X	X	X		X	X	X
	_____ (Signature and Date)							
.5	Test lube oil for bottom sediment and water (BS & W)							
	_____ (Signature and Date)							
.6	Test synthetic lube oil for soluble oil contamination							
	_____ (Signature and Date)							
.7	Draw sample for submission of Navy Oil Analysis Program (NOAP) sample (2 times)	X	X	X		X	X	X
	_____ (Signature and Date)							
.8	Fill out a NOAP sample label (2 times)	X	X	X				X
	_____ (Signature and Date)							
.9	Fill out a NOAP unit identification record (2 times)	X	X	X				X
	_____ (Signature and Date)							
.10	Submit a NOAP sample to servicing laboratory (2 times)	X	X	X				X
	_____ (Signature and Date)							
.11	Visually inspect lube oil samples (2 times)	X	X	X		X	X	X
	_____ (Signature and Date)							

		<u>A B C D E F G</u> X X X X X X X
305.2.12	Renovate oil using settling tank (2 times)	

(Signature and Date) (Signature and Date)

		X X X X X X X
.13	Renovate oil using centrifugal purifier (2 times)	

(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 24 PTS/24% OF WATCHSTATION.

305.3 INFREQUENT TASKS

For the infrequent task listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters must be monitored?
- G. How are monitored parameters changed by this infrequent task?
- H. What conditions require this infrequent task?
- I. Perform or simulate this task IAW EOSS.

305.3.1	Strip lube oil tanks (2 times)	
---------	--------------------------------	--

(Signature and Date) (Signature and Date)

COMPLETED .3 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

305.4	ABNORMAL CONDITIONS - None to be discussed.	
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305.5 EMERGENCIES

For the emergency conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/ watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW EOSS/Naval Ships' Technical Manual, chs. 262, 536.

305.5.1 Contaminated lube oil (2 times)

(Signature and Date) (Signature and Date)

.2 Oil spill (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

305.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

305.6.1 Normal (5 times)

(Signature and Date) (Signature and Date) (Signature and Date)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

305

LUBE OIL KING (CONT'D)

305.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

305.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

306 ASSISTANT FUEL OIL KING

NAME _____ RATE/RANK _____

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This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified ASSISTANT FUEL OIL KING
(NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____

Supervisor

RECOMMENDED _____ DATE _____

Division Officer

RECOMMENDED _____ DATE _____

Department Head

QUALIFIED _____ DATE _____

Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

306 ASSISTANT FUEL OIL KING

Estimated completion time: 12 weeks Total points this watchstation: 100

306.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE THE FOLLOWING:

306.1.1 SCHOOL:

Petroleum Oil Lubrication Course (K8212142) (RECOMMENDED)

Completed _____
(Qualifier and Date)FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED
PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL
WATCHSTATION QUALIFICATION.

306.1.1 FUNDAMENTALS FROM THIS PQS:

101 Engineering Safety Precautions

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

107 Fuel Oil

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

109 Physical Security

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hearing Conservation Program

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Shipboard Heat Stress Control and Personnel Protection

Completed _____ 2 pts/2% of Watchstation
(Qualifier and Date)

306

ASSISTANT FUEL OIL KING (CONT'D)

306.1.1 112 Engineering Administration

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

113 Hazardous Material Control and Management (HMC&M) Program

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

306.1.2 SYSTEMS FROM THIS PQS:

210 Fuel Oil Filling, Transfer and Storage

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

211 Ballast, Deballast and Stripping

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

213 Fuel Oil Service

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

306.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters/operating limits must be monitored?
- G. Perform this task IAW EOSS/EDORM/Naval Ships' Technical Manual, ch. 220, vol. 2; ch. 541; ch. 593, Planned Maintenance System.

306.2.1 Maintain appropriate logs

A	B	C	D	E	F	G
X	X				X	X

(Signature and Date)

		A	B	C	D	E	F	G
306.2.2	Fill out Fuel Oil and Water Report	X	X				X	X
	_____ (Signature and Date)							
.3	Prepare appropriate fueling memorandum	X	X				X	X
	_____ (Signature and Date)							
.4	Sound fuel oil tanks	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.5	Verify accuracy of tank level indicator by sounding	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.6	Draw sample with thief sampler	X	X	X			X	X
	_____ (Signature and Date)							
.7	Draw sample from transfer pump sample connection	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.8	Test fuel oil for bottom sediment and water	X	X	X			X	X
	_____ (Signature and Date)							
.9	Test fuel oil visually	X	X	X			X	X
	_____ (Signature and Date)							
.10	Obtain verification of BS&W results from EOOW/EDO	X	X	X			X	X
	_____ (Signature and Date)							

		A	B	C	D	E	F	G
306.2.11	Test fuel oil tanks with water indicating paste	X	X	X		X	X	X
	_____ (Signature and Date)							
.12	Shift fuel oil service tanks	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.13	Line up and operate stripping system	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.14	Line up and operate transfer system	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.15	Line up, operate and secure tank stripping pump	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.16	Line up, operate and secure fuel oil transfer pump	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.17	Pump up fuel oil storage tanks	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.18	Pump up fuel oil service tanks	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.19	Monitor fuel oil service tank levels	X	X	X	X	X	X	X
	_____ (Signature and Date)							

		<u>A B C D E F G</u> X X X X X X X
306.2.20	Empty contaminated tank	

(Signature and Date)

		X X X X X X X
.21	Line up and operate contaminated fuel system	

(Signature and Date)

COMPLETED .2 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

306.3 INFREQUENT TASKS

For the infrequent tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters must be monitored?
- G. How are monitored parameters changed by this infrequent task?
- H. What conditions require this infrequent task?
- I. Perform or simulate this task IAW EOSS/EDORM/Naval Ships' Technical Manual, ch. 541.

306.3.1 Ballast/deballast

(Signature and Date)

.2	Use storage tanks as service tanks	

(Signature and Date)

.3	Align, operate and secure Main Drain System	

(Signature and Date)

306.3.4 Proper venting of compensating tanks after lay-up

(Signature and Date)

COMPLETED .3 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

306.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this condition affect other operations/equipment/watchstations?
- G. What follow-up action is required?
- H. Perform or simulate the corrective/immediate action for this abnormal condition IAW EOSS/appropriate technical manuals, Naval Ships' Technical Manual, ch. 541.

306.4.1 Unusual pump vibration

(Signature and Date)

.2 Unusual pump noise

(Signature and Date)

.3 Plugged sounding tube

(Signature and Date)

.4 Partially clogged/clogged strainer

(Signature and Date)

306.4.5 High pump discharge temperature

(Signature and Date)

.6 Excessive pressure drop at filter/separator

(Signature and Date)

COMPLETED .4 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

306.5 EMERGENCIES

For the emergency conditions listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. What follow-up action is required?
- H. Perform or simulate the immediate action for this emergency condition IAW EOSS/Naval Ships' Technical Manual, ch. 079, vol. III.

306.5.1 Contaminated fuel oil tank

(Signature and Date)

.2 Ruptured fuel oil piping

(Signature and Date)

.3 Oil spill

(Signature and Date)

306.5.4 Loss of fuel oil suction

(Signature and Date)

.5 Casualty condition during fuel transfer

(Signature and Date)

.6 Leaking fuel oil tank

(Signature and Date)

.7 Class B fire

(Signature and Date)

COMPLETED .5 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

306.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

306.6.1 In port (3 times)

(Signature and Date) (Signature and Date) (Signature and Date)

306.6.2 Underway (3 times)

(Signature and Date) (Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 30 PTS/30% OF WATCHSTATION.

306

ASSISTANT FUEL OIL KING (CONT'D)

306.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

306.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

307 FUEL OIL KING

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation.
Recommend designation as a qualified FUEL OIL KING (NAVEDTRA 43116-5F).

RECOMMENDED _____ DATE _____
Supervisor

RECOMMENDED _____ DATE _____
Division Officer

RECOMMENDED _____ DATE _____
Department Head

QUALIFIED _____ DATE _____
Commanding Officer or Designated Representative

SERVICE RECORD ENTRY _____ DATE _____

307 FUEL OIL KING

 Estimated completion time: 4 weeks Total points this watchstation: 100

307.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE THE FOLLOWING:

307.1.1 SCHOOL:

Petroleum Testing/Handling Course (K-821-2142)

 Completed _____
 (Qualifier and Date)

.2 WATCHSTATION FROM THIS PQS:

306 Assistant Fuel Oil King

 Completed _____
 (Qualifier and Date)

307.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters/operating limits must be monitored?
- G. Perform this task IAW EOSS/Naval Ships' Technical Manual, ch. 220, vol. 2 and ch. 541.

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
307.2.1	Maintain necessary equipment and hardware for performance of required fuel oil tests	X	X				X	X

 (Signature and Date)

.2	Test fuel oil for flash point	X	X			X	X	X
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 (Signature and Date)

		A	B	C	D	E	F	G
307.2.3	Test fuel oil for API gravity	X	X			X	X	X
	_____ (Signature and Date)							
.4	Test fuel oil using free water detector and contaminated fuel detector's testers	X	X			X	X	X
	_____ (Signature and Date)							
.5	Maintain oil spill containment kit	X	X			X	X	
	_____ (Signature and Date)							
.6	Receive fuel oil	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.7	Act as pumping supervisor	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.8	Act as fueling supervisor	X	X	X	X	X	X	X
	_____ (Signature and Date)							
.9	Review fueling memorandums	X	X			X	X	
	_____ (Signature and Date)							
.10	Review appropriate logs	X	X			X	X	
	_____ (Signature and Date)							

		A	B	C	D	E	F	G
207.2.11	Review Fuel Oil and Water Report	X	X				X	X

(Signature and Date)

.12	Prepare appropriate fuel reports	X	X					X
-----	----------------------------------	---	---	--	--	--	--	---

(Signature and Date)

COMPLETED .2 AREA COMPRISES 24 PTS/24% OF WATCHSTATION.

307.3 INFREQUENT TASKS

For the infrequent tasks listed below:

- A. What are the steps of this procedure?
- B. What are the reasons for each step?
- C. What control/coordination is required?
- D. What means of communications are used?
- E. What safety precautions must be observed?
- F. What parameters must be monitored?
- G. How are monitored parameters changed by this infrequent task?
- H. What conditions require this infrequent task?
- I. Perform or simulate this task IAW EOSS/EDORM/Naval Ships' Technical Manual, ch. 541.

307.3.1 Defuel ship

(Signature and Date)

.2 Transfer fuel to another ship

(Signature and Date)

.3 Align transfer system to receive JP-5 from ship's storage tanks

(Signature and Date)

COMPLETED .3 AREA COMPRISES 6 PTS/6% OF WATCHSTATION.

307

FUEL OIL KING (CONT'D)

307.4 ABNORMAL CONDITIONS - None to be discussed.

307.5 EMERGENCIES

For the emergency condition listed below:

- A. What indications and alarms are received?
- B. What immediate action is required?
- C. What are the probable causes?
- D. What operating limitations are imposed?
- E. What other emergencies or malfunctions may occur if immediate action is not taken?
- F. How does this emergency affect other operations/equipment/watchstations?
- G. Perform or simulate the immediate action for this emergency condition IAW EOSS/EDORM, Naval Ships' Technical Manual, ch. 079, vol. III.

307.5.1 Casualty condition during refueling/defueling evolution

(Signature and Date)

COMPLETED .5 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

307.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

307.6.1 Underway (2 times)

(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 60 PTS/60% OF WATCHSTATION.

307.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

301.7.1 EXAMINATIONS Pass a written examination

(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature & Date)

FINAL QUALIFICATION SECTION FOR
OIL KING/WATER KING

NAME _____ RATE/RANK _____

This page is to be used as a record of satisfactory completion of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors give away their signatures, unnecessary difficulties can be expected in future routine operations. THIS QUALIFICATION PAGE IS TO BE MAINTAINED BY THE TRAINEE AND UPDATED TO ENSURE AWARENESS OF REMAINING TASKS.

	WORK CENTER SUPERVISOR	DIVISION OFFICER	DEPARTMENT HEAD	CO or DESIG REP	PAGE 4 ENTRY
--	---------------------------	---------------------	--------------------	--------------------	-----------------

301 WATER KING (MAIN BOILER)

INITIALS _____

DATE _____

302 WATER KING (AUXILIARY BOILER)/WASTE HEAT

INITIALS _____

DATE _____

303 WATER KING (DIESEL JACKET)

INITIALS _____

DATE _____

304 WATER KING (POTABLE WATER)

INITIALS _____

DATE _____

WORK CENTER	DIVISION	DEPARTMENT	CO or	PAGE 4
SUPERVISOR	OFFICER	HEAD	DESIG REP	ENTRY

305 LUBE OIL KING

INITIALS _____

DATE _____

306 ASSISTANT FUEL OIL KING

INITIALS _____

DATE _____

307 FUEL OIL KING

INITIALS _____

DATE _____

LIST OF REFERENCES USED IN THIS PQS

Class Advisory Notebook

Engineering Department Organization Manual (EDORM)

Engineering Operational Sequencing System (EOSS)

NAVEDTRA 10193-D, Instrumentman 3 & 2

NAVEDTRA 10535, Boiler Technician 3 & 2

NAVEDTRA 10536-F, Boiler Technician 1 & C

NAVEDTRA 10539, Engineman 3

NAVEDTRA 10543-E1, Engineman 1 & C

NAVEDTRA 10546-F, Electrician's Mate 3 & 2

NAVEDTRA 10564, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, vol. 2

NAVEDTRA 12001, Fireman

NAVEDTRA 12043, Basic Military Requirements

NAVEDTRA 12081, Standard First Aid Training Course

NAVEDTRA 12140, Boiler Technician 3 & 2

NAVEDTRA 12144, Machinist's Mate 3 & 2

NAVEDTRA 12147, Engineering Administration

NAVEDTRA 12960, Principles of Naval Engineering

NAVEDTRA 12964, Fluid Power

NAVMED P-5010-1, Manual of Naval Preventive Medicine

NAVMED P-5010-6, Manual of Naval Preventive Medicine

NAVMED P-5010-6, Manual Preventive Medicine

NAVSEA 0901-LP-420-0002, Naval Ships' Technical Manual

NAVSEA 59086-6X-STM-020, Naval Ships' Technical Manual

NAVSEA S9086-54-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-CH-STM-030, Naval Ships' Technical Manual

NAVSEA S9086-CL-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-GX-STM-020, Naval Ships' Technical Manual

NAVSEA S9086-GY-STM-000, Naval Ships' Technical Manual

NAVSEA S9086-GY-STM-01B, Naval Ships' Technical Manual

NAVSEA S9086-H7-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-HB-STM-005, Naval Ships' Technical Manual

NAVSEA S9086-HY-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-HZ-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-HZ-STM-020, Naval Ships' Technical Manual

NAVSEA S9086-K9-STM-000, Naval Ships' Technical Manual

NAVSEA S9086-KC-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-KE-STM-001, Naval Ships' Technical Manual

NAVSEA S9086-RH-STM-010, Pumps

NAVSEA S9086-RK-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-RW-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-S3-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-SE-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-SN-STM-000, Naval Ships' Technical Manual

NAVSEA S9086-SN-STM-002, Naval Ships' Technical Manual

NAVSEA S9086-SN-STM-010, Naval Ships' Technical Manual

NAVSEA S9086-SP-STM-000, Naval Ships' Technical Manual

LIST OF REFERENCES USED IN THIS PQS (CONT'D)

NAVSEA S9086-SX-STM-010, Naval Ships' Technical Manual
NAVSEA S9086-SY-STM-010, Naval Ships' Technical Manual
NAVSEA S9086-T8-STM-010, Naval Ships' Technical Manual
NAVSEA S9086-VG-STM-010, Naval Ships' Technical Manual
NAVSEA S9086-WK-STM-010, Naval Ships' Technical Manual
NVPERS 12960, Principles of Naval Engineering
NWP 62-1 (Revision D), Surface Ship Survivability
OPNAVINST 5100.19C, Navy Occupational Safety and Health (NAVOSH) Program
Manual for Forces Afloat
OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy
OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy
(SORM)
OPNAVINST 4100.11B, Navy Energy Usage Reporting System (NEURS)
OPNAVINST 5090.1A, Environmental and Natural Resources Program Manual
OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual
Propulsion Operating Guide (POG)
Propulsion Plant Manual (PPM)

LIST OF REFERENCES USED IN THIS PQS (CONT'D)

Personnel Qualifications Standard
Feedback Report
PQSDEVGRU DSN 922-1402

From _____ Date _____

Via _____ Date _____

Department Head

Activity _____

Mailing

Address _____

DSN _____

PQS

Title _____ NAVEDTRA _____

Section

Affected _____

Page

Number(s) _____

Remarks/Recommendations (Use additional sheets if necessary):

LIST OF REFERENCES USED IN THIS PQS (CONT'D)

(FOLD HERE)

DEPARTMENT OF THE NAVY

OFFICIAL BUSINESS

COMMANDING OFFICER
NETPMSA CODE 034
6490 SAUFLEY FIELD ROAD
PENSACOLA, FL 32509-5234

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LIST OF REFERENCES USED IN THIS PQS (CONT'D)